HINTS

ON

THE PRESERVATION OF

HEALTH IN ARMIES.

FOR THE USE OF

VOLUNTEER OFFICERS AND SOLDIERS.

BY

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"It is surely the first duty of a Government, as well as of a commander, to adopt every possible precaution which can preserve the health and life of the army, to which the honour and safety of the state are intrusted."—MacLeod, *Surgery of the Crimean War.*

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PREFACE.

The Preservation of Health in Armies, is everywhere a subject of recognized importance. So much, in fact, depends upon it, that precautionary measures in this behalf can never be exaggerated. All that can be done, should be done to protect troops against preventable disease.

It seems to have been formerly believed, that the presence of a Surgeon in each regiment was all sufficient for this purpose; and that officers and men could go their way free from any responsibility or apprehension on that score. But experience has proved that the preservation of health, in either one man, or many, is not purely *objective* with Surgeons. Too much, in this particular, is expected from them, and too little is done by officers to cooperate with them. Armies, like patients, must act in concert with their medical advisers, and make the matter of health *subjective* as well as objective. Officers and men need an insight into the general principles of hygiene, in order to be able to assist, themselves, in furthering prophylactic measures.

To supply them with the requisite amount of information, the accompanying popular manual has therefore

been prepared. In this, nothing like a formal treatise or text-book has been attempted. Its brevity, its omission of all scientific discussion, and of many statistical tables, will sufficiently indicate that the mission it is designed to perform is one eminently *suggestive*, and not in any sense *authoritative*. To "help, rather than to hinder," is the maxim which has guided me in its compilation; and desiring more especially to make this little "hornbook" of use to military officers and soldiers, rather than to Surgeons who possess such great textual authorities as Hamilton, Gross, Hennen, Larrey, and Boudin—I have consequently avoided as much as possible the terminology of medical science, as well as the discussion of medical principles.

Trusting that these desultory thoughts, which have thus crystallized themselves into the form of "Hints," may be productive of some measure of good, not only in provoking greater watchfulness over preventable disease; but also by stimulating other minds to worthier efforts in the cause of Military Hygiene, I now commit them to the hands of my countrymen, asking only to be permitted to remind them, that "Good fortune ever fights on the side of prudence."

J. O.

Roslyn, near New York,
May 23, 1861.

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HINTS

ON THE

HEALTH OF ARMIES.

CHAPTER I.

ON ARMIES.

It may be stated as a fundamental maxim in the science of warfare, that *a state of perfect bodily health is indispensable to the successful discharge of a soldier's duties.* Whatever influence (whether of soil, climate, diet, or discipline) interrupts this physical condition, disqualifies him to that extent for active usefulness. Armies being aggregations of individuals, each contributing something towards the strength, support, and moral influence of the general mass, it follows that the withdrawal of any units from this sum is *pro tanto* a diminution of the effectiveness of the whole. And worse than this, the weak and sick, in proportion as their numbers increase, demoralize the healthy, as well by the spectacle of their infirmities as by the increased duties, responsibilities, and apprehensions for the future which must inevitably fall

upon them. A sick army is always a demoralized force. Men, whose organic functions are either interrupted or vitiated by disease, can not perform their duties as before. They may still have courage, but courage in such cases becomes simply a spasm, and is lacking in all qualities of endurance. The first duty of a skilful commander is, therefore, to preserve the health of his troops; for their health like their ammunition is the instrument with which they can alone hope to conquer.

It seems to be hardly known outside of armies that the proportion of their mortality, under the most favorable circumstances, is *twice* that of civil life, although in this latter so many patent causes of disease manifest themselves as would make us infer differently. Dr. Farr, from observations made on the British army, presents us with the following fearful statistics:

Relation of Mortality.		Deaths annually to 1,000 living.
Ages.	Occupation.	Ratio
20 to 25	Civilians.	8·4
	Soldiers, ...	17·0
25 to 30	Civilians, ...	9·2
	Soldiers, ...	18·3
30 to 35	Civilians, ...	10·2
	Soldiers, ...	18·4
35 to 40	Civilians, ...	11·6
	Soldiers, ...	19·2

That this mortality is reducible to a ratio at least equal to that of civil life, is not to be questioned; for

we see it already so foreshadowed in the less percentage observable among old soldiers, who, without any additional safeguards to health beyond those possessed by their younger brethren, are yet from habit and induration protected from those lurking morbific agencies which decimate the latter; and if so reducible, then it is the duty of the state to prevent it, because preventable mortality is criminal mortality, and the responsibility for its occurrence rests at the door of those through whose negligence it has happened.

It is to a want of observance of simple hygienic rules, that we must charge this needless waste of human life; for it is not sufficient to say that the inevitable duties of a soldier—guard-mounting, drills, fatiguing marches, changes of climate, diet, and dwelling—necessitate so high a ratio of mortality. Experience, in fact, proves the contrary. Hunters and trappers are proverbially healthy men, although exposed to as great fatigues, hardship, extremes of weather, and vicissitudes of diet as soldiers. The cause of this excessive mortality is plainly due to something different from any one of the above assigned reasons, or even all of them combined.

Applied either separately or jointly to any one individual, they do not, as in the case of hunters, justify us in considering them as efficient causes. We must look, therefore, for another and more predisposing agency in the production of disease. And that agency we shall find in the *gregarious* mode of living, and the general negligence of preventive measures which prevails in most armies. The former is un-

doubtedly inevitable, but it need not be accompanied by a total disregard of those rules of health which are found indispensable to the well-being of all large communities. Men congregated in masses, and in small areas—overtasked, uncleanly, and improperly fed, whether they be soldiers or artisans, are subjected to precisely the same laws of health and disease, and the violation of those laws always entails the same fearful penalty upon all.

Military science has made stupendous progress within the present generation. In the improvement of arms in particular, it has signally triumphed. So terrible is its enginery now, that the possibility of any defence against its effects is almost abandoned. The art of offence has culminated. Before the destructive missiles hurled from the mouths of rifled cannon, neither wood nor stone can stand; and the reduction of any fortress against which such ordnance is brought to bear is simply a question of time. But with all the glory which the art of warfare has acquired, and with all the good it may have accomplished in equalizing disparity of forces, it will yet have failed in the first of all essentials, and left an unrelenting foe in its rear, so long as it ignores the necessity of incorporating within its principles a well-digested system of hygiene. Without this, the direst enemy will be found always in the very midst of the largest assemblage of men; striking right and left, at night and in the day, the "lean, cold hand of disease" will dismember an army more certainly than those who, heralded by drum and bugle, and visible

to sight, fall on it only with bayonet and sabre-stroke. It was Frederic the Great who used to remark with a sigh, that fever annually robbed him of more men than seven pitched battles. And yet, long as this startling truth has been known, and fearfully as it has illustrated itself in every army since the day when it was first uttered, no adequate measures have yet been taken in many countries to prevent the evil which thus decimates their armies. Overcrowded, ill-ventilated barracks, small, foul tents, indifferent provisions, badly organized hospitals, will continue to do their work of silent destruction, until medical men are allowed some power and discretion in the housing, feeding, and superintendence of troops. When this shall be done, we can hope for a marked diminution in the ratio of their mortality; but until it is done, we must expect to see the flower of every army cut off, and the state shorn of its most useful members in times of direst necessity.

It is upon officers, therefore, of every grade, that rests the responsibility of preserving the health of their men. From the highest to the humblest each has his portion to command, and inasmuch as any wanton, unjustifiable waste of life, either in an assault or on a battle-field, exposes an officer to a court-martial, so with the same propriety, and by parity of reason, should any negligence of sanitary rules, resulting in unnecessary loss of life, expose him to the same penalties. With a sufficient medical staff at his elbow, it is idle for the officer to attempt to shield himself behind the plea of ignorance, or those petri-

fied formalities which are the heir-looms of inflated officialism. In the presence of elementary forces hastening to develop disease, red-tape and official rubrics must vanish; hygiene, without waiting for the fecial college to declare war, must be allowed to attack the enemy and to demolish him, ere he has assembled his forces; after which "*general orders*" can again march on in their old conventional ways.

A chief source of disturbance to the health of all new levies is found in the *suddenness* with which they are translated from the comforts of home, and the moderate, generally self-imposed and self-regulated duties of civil life, to the extremes of diet, (quantity and quality,) fatigue and exposure, incidental to active operations in the field. This suddenness of transition is always depressing to the nervous energies in any contingency, either of civil or military life, but particularly, and more dangerously so in the latter, because of the necessary inability of obtaining periods of intervening rest during which nature can gradually recover herself from the direct and reflex shocks under whose influence she is laboring.* Placed in this po-

* The statistics of the French army show the following to be the average proportion of its mortality:—

	LOSS IN EACH 1,000.
During the 1st year of service, ...	7·5
" " 2d " "	6·5
" " 3d " "	5·2
" " 4th " "	4·3
" " 5th " "	3·
" " 6th " "	2·
" " 7th " "	2·

It is thus seen that the first year is the most fatal to soldiers.

sition, the soldier may be considered as directly inviting an attack of disease; nor will it be slow to appear, or fail to assume an epidemic character when corresponding in type to the constitutional tendencies of the season.

Now, the best protection to health is the possession of health, which like a shield protects us against morbific influences only so long as we preserve it entire. Other things being equal, in any exposure to the sources of disease a man in vigorous health will longest endure, while those of inferior physical tone soonest succumb. Hence, it becomes, in an economical point of view a matter of the gravest importance to the state, to see that its armies are formed out of the most able-bodied of its adult population. The soldier must be healthy at the start, if he would enter the service with any hope of being useful to his country, or to acquire distinction for himself. Statistics show that disease is nearly *four times** more formidable to armies than bullets, and the weak are very sure to fall first beneath the shafts of this unerring marksman. This being the case, science is called upon to provide means adequate to interrupting all preventable diseases in the soldier when actually in the service, as also to sift out from among recruits all those whose physical constitution is por-

* The mortality tables in the British army in the Crimea show that in the first two months from Sept. 8, 1854, to Feb. 7, 1855, it lost at the rate of 591 *per thousand* by disease, and only 108 by wounds. The French, in the last six months of the campaign, had of killed and wounded 21,917 to 101,128 sick with various diseases.

manently defective. We must have healthy, well-knit men for recruits in order to make strong and resolute soldiers, and we must have strong and resolute soldiers in order to form invincible armies.

It will be perceived from these observations, that a well ordained and enforced system of *hygiene* is indispensable to the maintenance of a healthy army; and in order that such a system may work to its greatest advantage, not only the surgeons who plan and direct its details, but, and as far as can be intelligible to non-medical men, all officers should know enough of its outlines to enable them the better to cooperate with their medical advisers.*

The first step in the formation of an army is the selection of young and able-bodied recruits. And for the purpose of securing these, a thorough medical examination of each candidate should be made. This examination must be conducted by the medical inspector in person, assisted by a non-commissioned officer, and always by daylight.

* The opposition to sanitary reforms, which is encountered not solely among the ignorant poor, but too often among educated laymen, leads to the belief that the cause of antagonism is similar in both classes, and resides in that *ignorance* of the powers of hygiene, which accepts disease as a *fate*, and consequently scoffs at those who endeavor to avert its shafts. When men can be made to believe that health is our natural state, and that God has given us means for preserving it in the very elements around us, they will no longer hesitate as to the line of their duty, but will zealously coöperate in all efforts to prevent disease.

CHAPTER II.

GENERAL RULES FOR THE EXAMINATION OF RECRUITS.

The surgeon, having first satisfied himself that the candidate is within the prescribed age, (18 to 45,) will order him to be stripped naked, and placed with his back to the light.

General Anatomical Features.—Placing himself at a convenient distance he will first scan the anatomical proportions, or general conformation of body, shape of the head, chest, abdomen, and limbs of the recruit, viewing him in front, rear, and sidewise; after which he will command him to march forward and backward, cause him to bend forward, jump, kneel, sit and rise rapidly, all the while noticing whether there be free and unembarrassed motion of the large joints and muscles.

First Observation.—The surgeon will now proceed to a particular examination of the *head*, *ears*, *the hearing*, *eyes*, and *teeth*. The eyes, and their power of sight require the closest scrutiny. For this purpose the recruit should be tested with suitable objects

at various distances. Each eye should be separately tested as by taking aim, &c.; tests for color blindness should also be applied.

Second Observation.—Examinations must then be made of the *neck*, *chest*, (*external* and by *auscultation*,) *back* and *loins*, including the *arms*, their flexor and extensor muscles, the *hands* and all the digital muscles, and particularly all the articulations. Every finger, the wrists, the elbow and shoulder joints must be flexed and extended, separately and together.

Third Observation.—The abdomen and buttocks, the testicles, scrotum, and inguinal regions, the penis, and anus must next be inspected.

Fourth Observation.—The *thighs* and *calves* of the legs, with all their articulations, must be inspected; varicose veins must not be overlooked.

Fifth Observation.—The feet and their shape; the toes, their joints and muscles, must be carefully inspected. Also the mode of step. Is the recruit *splay-footed?* Do the toes turn in or out?

Sixth Observation.—The *stature* of the recruit should now be measured, and where there is any suspicion of his attempt to increase its appearance, he should be measured supine, instead of erect. It should be noticed also whether he has had the smallpox or been vaccinated.*

* Vaccination, although not insisted upon as a prerequisite to enlistment, should be performed upon all who have not been thus protected, as soon as they reach a depot. The vesicle will not prevent the use of the arm in drilling, and is too slight an in-

DISQUALIFYING DISEASES.

These may be divided into two classes, viz.: such as imply *absolute*, and such as imply *relative* incapacity for military service.

CLASS FIRST.

Relating to Organic or Articular Degeneration, General Mal-conformation or Absence of Parts.

Phthisis, aneurism of large arteries, scrofulous ulcers, voluminous goitre; privation of sight or hearing; dumbness; permanent aphonia; loss of an arm, leg, foot, hand; curvature of the long bones; rickets; anchylosis; paralysis, or retraction of the flexor or extensor muscles of a limb; atrophy; obesity; talipes.

CLASS SECOND.

Relating to Particular Affections of the Head, Trunk, Limbs, and Skin.

HEAD.

Extensive injuries of skull, (depression, exfoliation) giving rise to occasional giddiness, drowsiness, pains in the head, and affections of the intellect; loss of right eye; fistula lachrymalis. Habitual diseases of eyes, ophthalmia, rheums, &c.; weakness of sight; myopia; nyctalopia; amblyopia; deformity of nose,

convenience to be thought of as against the advantages secured. Let this duty to society never be omitted by surgeons.

capable of interrupting freedom of respiration; ozæna; caries and incurable polypus; incurably fetid breath; discharges from the ears; loss of upper or lower incisors; necrosis of jaw; fistulas of the maxillary sinuses or salivary glands; difficulty of deglutition, from paralysis or other incurable lesion; chronic affections of the organs of hearing, voice, or speech, sensibly impairing their use.

NECK, CHEST, ARMS, HANDS.

Ulcers, and scrofulous tumors; deformity of chest; Pott's disease, or any spinal curvature affecting respiration or the carrying of arms and wearing of accoutrements; phthisis, (incipient;) chronic asthma; habitual hæmoptysis; total loss of the thumb or of the fore-finger of the right hand, or two other fingers of one hand, or the mutilation of the last joints of one or several fingers of the *right* hand; * paralysis of either arm; affections of any muscles or joints in the arm or hand impeding their free motion, (arthritis, chronic rheumatism,) and incurable deformities in any of these parts.

ABDOMEN.

Irreducible hernias; calculus; gravel; habitual incontinence or retention of urine; fistulas and se-

* These deformities do not disqualify the recruit for service *absolutely*, as he may still discharge the duties of a *miner*, *sapper*, *pioneer*, or *artillerist*—and many others above enumerated would still leave him in a condition to perform certain *garrison* duties. The disqualifying diseases which we have cited, refer more particularly to recruits designed for *active* service in the field.

vere diseases of the urinary passages; strangulation of testicle, sarcocele; hydrocele; varicocele; and all incurable affections of the scrotum, testicles, penis, or spermatic cord: ulcerated hæmorrhoids; fistula in ano; periodical hæmorrhoidal flux; *habitual* incontinence of fæces, and prolapsus ani; chronic weakness of the loins, accompanied by inveterate lumbago.

LOWER LIMBS AND FEET.

Large varices; incurable ulcers; affections of muscles or joints impeding their free motion. Severe diseases of the bones; loss of great toe, or two toes of a foot; incurable deformities of feet.

SKIN AND CONSTITUTIONAL AFFECTIONS.

All contagious diseases when become chronic and inveterate, such as tinea, herpes, psora, elephantiasis and lepra; well-marked cachexy of a scorbutic or glandular character; debility and extreme emaciation; a too diminutive or tall stature accompanied by weakness, and leanness or obesity; gout and sciatica; chronic rheumatism impeding the free motion of the trunk or limbs; epilepsy; convulsions; chorea; general or partial paralysis; imbecility.

NOTE.—The surgeon will, on a printed blank furnished for this purpose, note the *cause* of rejection of every recruit.

CHAPTER III.

EDUCATION OF RECRUITS.

Recruits, when assembled and about to be drafted into various corps, should first of all things be *classified* with reference to such antecedents of trade or vocation, or such bodily or mental capacity as can impart to them predominant qualifications for the different arms of the service. By this means much time will be gained which otherwise would have to be consumed in a species of rough and hasty apprenticeship in these several preliminaries to military usefulness. This apprenticeship is always more or less chafing to young recruits, who are apt to suppose that once enlisted they are fit to undertake all a soldier's duties, and who repudiate every idea of mechanical handicraft as incompatible with a military profession. Yet learn they must, and the more nearly the duty corresponds to former avocations, the more rapidly they will learn, and the more easily and cheerfully they will labor. Time and health will thus both be economized.

The following table will illustrate the subject by

furnishing the elements on which such classifications should be based.

CLASSIFICATIONS BASED ON ANTECEDENT QUALIFICATIONS.*

Corps.	Antecedent qualifications.
Engineer.	Should have worked in a furnace or forge, been a blacksmith, nailsmith, cartwright, carpenter, joiner, miner, mason, bridge-builder, cooper, boat-builder, saddler or harness-maker, and generally acquainted with tools.
Artillery.	Should have been a cartwright, artisan, or worked in iron and wood; accustomed to ride, drive, or tend horses.
Cavalry.	Should have been accustomed to riding, driving, or tending horses. Should be tall and large-framed.
Riflemen.	Should be lithe, well-knit, not over-tall, muscular, accustomed to long tramps, to hunting, and to the use of fire-arms.
Infantry of the line.	Same as foregoing, except being taller and larger-framed.

* The *dynamometer* is an instrument whose assistance should be invoked in classifying men for service in those branches requiring great *manual* or *pedal* strength. In selecting artillerists, whether on sea or land, sappers and miners, and others of kindred occupations, its scale should always be applied, in order to determine the positive power possessed. We accordingly subjoin

In the European service *stature* is a prominent element of classification. It is not so yet with us. Extremes only are avoided.

As raw troops are an unreliable material with which to undertake a campaign, serving too often only to encumber hospitals and to confuse the movements of regulars in times of peril, it becomes of the greatest importance to give the recruit the benefit of some probationary exercises in barracks by way of weaning him from old habits, and gradually strengthening and disciplining him for the severe duties of the field. As this discipline involves a radical change in diet, exercise, sleep, and clothing, it is necessary that it should be conducted under the immediate direction

a table illustrative of the averages of human strength as measured by it, in the French service.

RENAL STRENGTH.				MANUAL STRENGTH.							
Age.	Power.	Age.	Power.	Age.	With both hands.	With Right.	With Left.	Age.	With both hands.	With Right	With Left.
	Myr.		Myr.		Kilo.				Kilo.		
11	4.8	19	13.2	11	29.2	10.7	9.2	19	79 4	37 4	35.0
12	5.1	20	13.8	12	33.6	13.9	11.7	20	84.3	39 3	37 1
13	6.9	21	14 6	13	39.8	16.6	15.0	21	86.4	42 0	38 0
14	8.1	25	15 6	14	47.9	21.4	18.8	25	88.7	44.1	40.0
15	8.8	30	15.4	15	57.1	27.8	22.0	30	89.0	44.7	41.3
16	10.2	40	12.2	16	63.9	32.3	26.8	40	87.0	41.2	38.3
17	12.6	50	10.1	17	71.0	36.2	31.9	50	74.0	36.4	33.0
18	13.0	60	9.3	18	79.2	38.6	35.0	60	56.0	30.3	26.0

See *Dictionnaire des Sciences Medicales*, art. *Dynamometre.*

The French Kilogramme is equal to 2 lbs. 3 oz. 5 drs. Avoirdupois.

The French Myriagramme is equal to *ten* Kilogrammes.

of a medical officer, in order that the constitutional idiosyncrasies of some may be duly and gradually overcome, instead of being rudely shocked by an unrelaxing severity which may tend to develop disease otherwise preventable. The medical officer, therefore, should be allowed to grant dispensations to recruits newly enlisted, from the performance of certain duties, or in the duration of their execution, until satisfied that the recruit is able to bear them. Thus guard-mounting after the fatigues of the day should be regulated in duration according to the ability of the recruit, the season, and the weather; exercise of a new kind to him should be similarly conducted, the idea always being to *convert* the recruit into a soldier by making every step of the apprenticeship a profitable one in health and a stimulus to his ambition, instead of breaking him down by the first week's discipline, and keeping him in hospital for a month to get over it.

That exercise in the open air invigorates the frame all from experience know. By increasing the activity of our functions, and rendering us less susceptible to the influences of weather, it enables us to perform fatiguing labors without any ill consequences, and thus develops in all a high measure of muscular ability. But this result is not immediately to be attained, any more than the growth of the body can be compelled beyond nature's own ordained periods. Muscle like mind must be gradually educated, and in both undue tension or ill-regulated effort only serves to retard development. A certain time is required

to habituate the frame to *continuous* effort of even the most moderate kind, and the longer the period of apprenticeship, the more confirmed will be its good effects. Among the Romans, military education began in extreme youth. Gymnastics and games of all kinds inured the citizen from early life to the fatigues of field exercises. Hence, when he arrived at man's estate he was a perfected soldier in physical development already.

But with us, no preliminary education of the muscles in youth prepares the recruit for the active duties of the soldier. Fresh from the long-debilitating life of the counting-room, the factory, or the thousand sedentary pursuits of the civilian, he steps into the ranks of the army, and loads himself down with arms and baggage to make a fatiguing march of many miles. Weak in his shoulders, his loins, his wrists, and his knees—not carrying so much weight once in a year as his knapsack amounts to, and hardly ever marching off ten consecutive miles at any one time or sleeping out of his own bed, it is little short of cruelty to take such a man into the field and impose all its unrelenting hardships upon him. His life is jeopardized from the very start by his own insufficiency of muscular discipline, and he can hardly be of use to the state although burning with the ardor of patriotism.

Let officers, then, remember that the human machine is capable of performing only a very limited amount of any new duty at first, and that if pushed beyond this, its energies are exhausted and a typhoid

state supervenes. Dr. Levy, one of the surgeons in chief to the French army, remarks that forced marches, heavy drills, and too prolonged exercises always increase the hospital list; and even where the muscular strain is not sufficient to produce acute disease, and yet daily transcends the measure of individual strength and organic repair, however slightly, it gradually and insidiously produces a state of deterioration and general debility.

In order to avoid so disastrous a result, the rule of exercise should be one of *gradual progression*. It is always better to stop short of actual fatigue. For this purpose, recruits should be drilled with moderation at first. Twice daily, with intervening hours of rest, the drill not extending beyond *two* hours at each session, seems about as much as any new recruit coming from sedentary pursuits can endure. This amount can be increased, of course, after a few days' practice with the majority of men; but there will always be some who will lag under the effort, and to these, hygiene, rather than severity, had better be applied. Muscular vigor is not a fixed and definite power in man. It varies with the age, original constitution, diet, profession, season, and weather. These elements must be fully considered and have due weight allowed them, when allotting measures of exercise and effort to recruits. By degrees, all may be brought to bear the amount of exercise required by the most laborious kinds of drilling, but caution at the outset must be observed with the *younger* recruits. A month is a short time in which to make a

penman, with attenuated wrists and fingers, capable of twirling a musket or sword; or a tailor or shoemaker with shrunken legs capable of marching fifteen miles, day after day, fully armed and equipped. Some may attain to this ability in that time, but it is certain that all can not. The competent should speedily be transferred to their various places in the field, and the tardy kept drilling until in like manner perfected. This graduation of the former will serve greatly to stimulate the latter.

Another fact to be borne in mind is, that all exercises do not produce the same effects upon the system. Some develop one class of muscles, and some another. Steady, measured exercise which produces a harmonious development of all the muscles, rather than strong, violent efforts which develop only particular parts, is what the soldier needs. In modern times, it is not athletes capable of bending the bow of Ulysses, or wielding the club of Hercules, that we need, but active, lithe, symmetrical, and indurated men. The French zouave or chasseur is not a Hercules in size or even strength, but like a combination of steel and whalebone, he wears well under fatigue, and springs back from it with wonderful recuperation.

Most authorities in military surgery are agreed in denouncing the enlistment of men *under* 20 years of age. Statistics show that enlistments made in violation of this suggestion only serve to encumber the hospitals, without otherwise increasing the strength of armies. As an illustration of the importance of

age, it is only sufficient to state that, in the French campaign of 1805, the army marched some 1,200 miles to reach the battle-field of Austerlitz, without meeting with any appreciable sickness or loss in numbers. Its youngest soldiers were 22 years old, and had served *two* years. But in the campaign of 1809 the army marched only a short distance from Germany into Austria, and yet, before reaching Vienna, all its hospitals were filled. The majority of its new conscripts were under *twenty* years of age. It was on this occasion that Napoleon wrote to the legislative senate asking for a new levy, and saying: "*I must have grown men; boys serve only to encumber the hospitals and realms.*"

Recruits should first be drilled in the lightest of their usual garbs, (fatigue dress.) No overcoat or knapsacks should be worn until fully accustomed to the manual of arms. Afterwards these *impedimenta*, as the Romans called baggage, can be put on *gradually*. The drill over, the men should be ordered to wash their faces, hands, and arms, if the weather be warm, otherwise it is not necessary. These precautionary measures will both refresh them, as well as afford protection against imprudence in drinking cold water when overheated, and in exposure to draughts of air. It should never be omitted in summer.

Recruits should not be exercised *fasting*, nor in the full blaze of a noon-day sun in summer, and it is well to allow during the drill an occasional intermission for a few minutes for the purposes of rest. In order to guard them against the effects of the ever-

repeated imprudence of unbuttoning their jackets after drilling to "cool off," the last part of the exercise should be reduced in vigor, and thus afford the circulation an opportunity gradually to diminish its rapidity.

The new exercise of prolonged running, better known as the "gymnastic step," is one of exceeding danger when performed with knapsack and accoutrements. The very constrained condition of the chest, particularly when a cross-belt is worn, impedes free respiration; the lungs are rapidly inflated, but only in their upper portion, while the lower lobes retain too long the air required to keep them dilated; whence follow an increasing engorgement and difficulty of respiration, verging almost towards suffocation. Great care is consequently required in initiating soldiers into this most trying of all exercises, for an error in excess here may speedily cause hæmorrhage, and permanent pulmonary or cardiac mischief. The first thing to be taught the soldier is to harmonize the breathing with the motions of the limbs. This act once acquired, he can run, even when burdened, with facility.

But there will always be found a large number of men who cannot run with facility. These will ever lag in such an exercise, and so interrupt the order of the column. Where special duties of running devolve upon any corps, it would be proper to recruit it from among those who are possessed of this faculty. As a general rule, small, lithe men, with broad shoulders, run and march best, and it is also to be

observed that, past the age of forty, few men can follow this rapid step. Zouaves and riflemen, therefore, should be formed out of only young men.

Horsemanship is another of those exercises which require gradual progression. Although unquestionably healthy for the majority of men, there are yet those in whom ill consequences follow from its excessive practice. Hernia, and inflammations of the testicles often testify to the effects of incessant jolting in the saddle, and it is advisable for all horsemen to protect themselves against these accidents by wearing a suspensory bandage.

But the best exercises for the soldier are those in which he does not simply obey a command mechanically, but employs his own mind and body under the varying impulse of each present necessity. Thus in *fencing*, *broadsword* and *bayonet* exercise, he has to exert his own faculties of offence and defence, independent of the command of any superior: and the necessary extension of limbs, variety of attitudes, and rapidity of motion which it requires—the sudden contraction and relaxation of muscle, and the acceleration of respiration which it occasions, heightens the tone of the whole system. The eyesight is quickened, the chest enlarged, the joints strengthened, the body rendered supple and muscular so as to secure the best and readiest use of all its faculties. No one, who has seen the almost miraculous change in the port and strength of the soldier, which can be wrought by fencing and the bayonet exercise, will

hesitate to assign them the first rank in the hygiene of a military education.

Between the hours of drill, the men should, under the guidance of their various officers, be taught how to clean and keep in repair their arms; how to make cartridges; fill shells; take apart and pack gun-carriages; make fuzes gabions fascines, &c. Any little occupation like this, by keeping the mind active, stimulates it to acquisition and raises the soldier's own self-respect.

Besides the drill within the barrack-yard, and as part of the same in time consumed, recruits should be made to perform daily marches in the field, fully equipped. They should begin with short distances, then longer ones, throwing out flanking parties and advanced guards, establishing pickets, encamping and striking tents while on the march. The art of throwing up intrenchments, making and repelling feigned attacks, should also be taught, in order to inspire them with confidence and self-reliance. These daily marches varying in direction, length, and duties performed, would preserve the spirits as well as the health of the recruit, and give him what he so much thirsts for—a practical idea of the contingencies of war.

In addition to the moral effect of keeping soldiers actively employed, the gymnastic discipline derived from marching each day in different directions—from digging, lifting, running, leaping—in hardening the muscles and developing the strength of the soldier, is the very best school in which to perfect his attain-

ments. Nothing but gymnastic exercises made the light-armed Greeks so terrible in battle; and nothing but similar exercises have made that perfection of all modern soldiers, the French zouave. And, inasmuch as these field exercises are the very ones which the soldier is eventually brought to perform in war, he cannot be too well prepared for them during the period of his military pupilage.

Habits of cleanliness should be particularly insisted upon wherever practicable. Soap, towels, and brushes can always be used in barracks, and every morning each man should be made to wash *face, neck, arms*, and *feet* in cold water. At roll-call, each corporal should report the state of his squad in this particular, to the officer in command.

As much of the *outside* clothing as can be dispensed with should be removed at night. This should be *insisted* upon, and the men, instead of one blanket, should be furnished with *two*, to compensate for the deficiency in covering thus created. In the field, when the soldier cannot undress, one blanket *may* be sufficient,* but this one should be of the firmest texture; and, as a further protection in wet weather, a rubber blanket should be given him.

Owing to the porous nature of all textile fabrics, and their retention of organic matter in the form of emanations, blankets should be daily aired and ex-

* The Government furnishes each man with only *one* blanket, and that often as sleazy, almost, as a bolting-cloth. This criminal neglect of health should be palliated by giving the soldier a *rubber* blanket in addition, thus keeping him *dry*, if not warm.

posed to the sunlight. If the weather will not admit of its being done out of doors, it should be done indoors, and in rooms with open fire-places and lighted fires. At least once a week, every well man should be compelled to *thoroughly* wash himself and change his body clothing.

The proper ventilation of dormitories at night, and of guard-rooms during the day, must never be overlooked, and recruits should be taught the importance of appreciating and enforcing rules for its observance.

Corporals should also make an inspection of the men when in bed, to see that they are properly undressed, that their garments are dry, and that the orders of the medical officer, relating to the wearing of particular articles of clothing, are strictly observed.

Wherever practicable, daily bathing in summer should be permitted and advised. But it should be done under the eye of an officer, the men being marched down to the bathing ground in squads, and allowed to remain only a few minutes (from 5 to 10) in the water. This length of time is sufficient for all purposes of ablution. *But no bathing should on any account be permitted immediately after meals, nor at evening.* The habit is a dangerous one in many ways, and should be discountenanced.

By the various hygienic measures above enumerated, when systematized and carried into effect, a corps of young recruits may be so strengthened and hardened as to enable them, after a month's sojourn in barracks, to take the field with very fair chances;

whereas, without such gradual breaking in, the new volunteer, passing suddenly from the counting-room to the ranks of an army, is likely to wilt under the first day's march; to be sickened by the meagreness of his new diet, and to be found in the hospital rather than on the battle-field when the enemy makes his appearance.

CHAPTER IV.

HYGIENE OF BARRACKS.

Barracks, not being castles of defence but simply habitations, should always be constructed with particular reference to hygienic requirements. But, in order to be habitations of comfort, they must first be habitations of health. No false economy should be permitted to interfere with this most important of all considerations. And it should be remembered also that it is easier to provide for it during the construction of an edifice than by remodelling it afterwards.

The paramount necessities of all buildings destined for dwellings, are a free and constant supply of pure air, and a due exposure to sunlight.* Both these necessities are increased by the number of hu-

* As an illustration of the importance of sunlight, it is stated that, in the citadel of Ghent, in 1845 and 1846, those companies which lodged in subterranean apartments had twice as many sick as those which lodged above ground. Few persons outside of the medical profession really appreciate the deteriorating influences produced upon the human constitution by depriving it of the vivifying stimulus of sunlight. The very air becomes in some measure deteriorated by its long absence.

man beings inhabiting them; but the former, at least, is indispensable from the very start. Insufficiency of air and its consequent depravation is not, however, one of those active causes which kill on the spot. But it is the more dangerous, because of the insidious effects produced upon the constitution, and the inability to detect them ere serious mischief is done. The general alterations in the system produced by it manifest themselves in the form of chronic glandular degenerations, like scrofula, phthisis, &c., or of such contagious maladies as typhus, variola, purulent ophthalmia, and dysentery. Statistics have long shown the large proportion of deaths from phthisis and typhus occurring in all armies, and if this be so, then what better cause can be assigned for it than that of overcrowding and ill ventilation in barracks, huts, and tents?

Dry, airy sites, with a proper slope for drainage, and an exposure to sunlight, are the best sites for barracks. They should not, when erected in cities, be placed in densely populated portions, or be surrounded by high buildings.

Whatever the size of the building or material of construction, the walls should be thick, in order to insure perfect dryness, and windows of sufficient size (the larger the better) should abound on all sides. It is better to have the building with as long a front as possible. If wings are necessary they may be added, but never so as to form a perfect square with an inclosed court-yard, as this latter is in such cases always a nursery of dampness.

All mess-rooms, guard-rooms, and dormitories should have an altitude of at least 15 feet, be thoroughly ventilated, and be situated so as to receive the sunshine during some portion of the day. The walls and ceilings should be plastered and painted, so as to exclude dampness and admit of cleansing.

The best size for dormitories, consistent with health, is such as will contain from 12 to 14 beds. But the number of occupants in any room should always be so calculated as to afford to each man 400 cubic feet of air, with ventilation adequate to supplying him with 40 cubic feet of fresh air per hour.* For this purpose, windows must be partially opened at night, and fully during the day, whenever the weather permits.

The bedstead should be of iron, and single, and the bed should consist of a thick straw pallet and pillow. Sheets are cleanly and should not be dispensed with in barracks. All beds should be turned, and bedding aired daily. But when soldiers are preparing

* In illustration of the dangers which ever attend *overcrowding*, in even the best-regulated barracks, may be cited the facts observed in the military hospital of Versailles, from 1843 to 1847, where an annual epidemic of typhoid fever was seen to prevail among patients brought from the garrison of St. Cloud. This epidemic declared itself annually a few days after the arrival of the king at the palace of St. Cloud, and disappeared immediately on his departure. Ordinarily the garrison there consisted of from 400 to 500 men, but the king's advent increased it to 1,200! The troops were consequently overcrowded in all their quarters, and typhoid fever invariably manifested itself. This fact is a significant commentary upon the deleterious influences that always attend upon overcrowded establishments, and will apply to gaols, workhouses, and pauper asylums, as well as to barracks.

for immediate service in the field, they should be gradually weaned from the use of sheets, and even the straw pallet, and made to rough it on the floor in their blankets, with knapsacks for pillows.

All *wash-rooms*, *mess-rooms*, and *guard-rooms* should be on the ground floor, and the former should be tiled, with a sloping floor, and a drain running through the centre. Around the wash-sinks, wooden gratings should be placed for the men to stand on while performing their ablutions.

All *privies*, *urinals*, and *cess-pools* should be daily disinfected in the absence of any stream of water running through them.* They should communicate with a subterranean sewer, and be under semi-weekly observation by the medical officer of the post.

There should be an ante-chamber to the guard-room, with a fire kept burning in it during wet weather, where men coming in from out-door duties may put off and dry their *wet* outside garments.

The barrack-yard should be planted with trees as much as practicable. *Evergreens* (pines in particular) are preferable on the score of health, as well as room.

No copper or lead vessels should be used in cooking, except when *tinned*, and their condition should be frequently inspected by the medical officer of the post.

All floors, except those of bed-rooms, should be

* Among the cheap disinfectants may be mentioned the Chloride and Sulphate of Lime (Gypsum, *in powder*, and Sulphate of Iron (Green Copperas, *in solution*, and Sulphuric and Muriatic Acid Gas.

daily scrubbed in fine weather, as well as swept. The sweeping must never be omitted; the scrubbing may be, in wet weather. Floors should be kept painted. Ceilings and walls should be whitewashed as often as once a month.

The men should not be allowed to wear their shoes to their dormitories, but should leave them in their lockers when they go to bed.

A urinal should be fixed near the door of each dormitory, and used only at night.

CHAPTER V.

THE MARCH

A military march is one of the most fatiguing of all exercises in walking, and in its effects upon the system must not be judged of by any similar exertion singly undertaken in civil life. It is one thing to walk alone, and as you please, with as little or as much load as you may prefer, with the privilege of resting as often and as long as you please, and of going only as far as inclination prompts; and it is quite another and a different thing to march in rank, and always in the same place, keeping step with one before you, treading amid clouds of dust, clad warmly, and heavily burthened with accoutrements, unable to stop at the first promptings of fatigue, and compelled to accomplish a certain per diem of locomotion. Such is a military march. Thus the weak must keep up with the strong, the man of short stride with the one of long; and the very regularity of the step does, when prolonged, tend to make it wearisome and exhausting.

Another consideration when marching also deserves to be thought of, and that is the privilege of

swinging the arm, which, as a balance to that side of the body opposite the musket, becomes an imperious necessity for comfort. Although forbidden on occasions like *drills* and *parades* as being ungraceful, the restriction should, in kindness to the soldier, be removed on the march. Wherever it is practicable the men should be allowed to march freely, and without the restraint of well-dressed ranks. In this way the march is relieved of much of its harassing character, and becomes a salutary and tonifying exercise. The men are more cheerful, more ambitious, and capable of a higher measure of endurance. The skill of a commander cannot be better shown than in preserving the spirits of his troops while causing them to perform long marches.

One of the pre-requisite conditions to all good marching is the possession of a pair of good feet. The feet in fact are the battle-charger of the infantry-soldier, and serve to carry him through the march and the fray. It becomes important, therefore, that he should keep them in good order. For this purpose, the pattern of all army shoes should present us with a *broad sole* as the first preventive to cramping the feet; a *stout single-soled* shoe made of light kip leather, laced around the ankle, combines all the elements of lightness and durability, protection to the foot, and support to the ankle, which can be desired in any shoe. Over such an article, a gaiter would not be needed, although, if possible, they should be worn, and when so, the shoe would not need to reach so high.

In the *disposition* of a march certain *hygienic* as well as strategic elements enter. For it is evident that if the character of the march be so imprudently designed as (by *excess of length, exposure to storms, roughness of country, and omissions of intervals of rest and refreshment*) to fatigue and harass troops, a commander will succeed only in breaking down his soldiers, so that the more he marches, and the nearer he approaches the enemy, the less fit he will be to encounter him. In an enemy's country it is always better to make *short* marches, and to keep troops fresh, than to attempt long ones, which only result in swelling the sick list. Fatigue and exhaustion are as destructive to courage, as they are to endurance, and when General *Debility* takes command of an army, the possession of rifled-cannon and Minié balls are of little avail to it. Tonicity of muscular fibre is like dryness to powder; the more there is of it, the greater the destructive power engendered, while flaccidity on the one hand and dampness on the other, render both these ministers of war absolutely inert.

Too long, too rapid, or ill-regulated marches, are ever apt to occasion sickness, and to provoke those inevitable results of over-fatigue, complete prostration, and internal congestions. The fact is so often made manifest in the increase of the hospital list, which ever follows upon ill-regulated and fatiguing marches, that it hardly needs repetition. We find in the *Archives de Medecine Militaire** the following

* Tome 9, page 15.

incident most strongly illustrative of the point under review. Two brigades arrived at the same dépôt; the one had made protracted marches, partly by night; the other short and slow ones, always by day, and here was the result as furnished by the hospital-record:

Marching by Long Stages Partly by Night.

2d Regiment had 60 days of sickness.
4th " " 41 " "
6th (1st batt'n) 43 " "

Marching by Short Stages Always by Day.

1st Regiment had 32 days of sickness.
6th (2d & 3d bat.) 14 " "
12th Reg't had 19 " "
3d Chass.(foot) " 23 " "

Thus those who made long marches, and partly by night, lost *twice* as much time by sickness as those who made short marches and always by day, a significant commentary upon the hygiene of exercise.

The hygienic considerations that should regulate a march are those of *season, weather, physical character of country, and condition* of troops. The same length of daily march which might be accomplished in winter, could not with safety be gone over in summer; nor in a rain-storm as on a dry day; nor in a flat, sandy country, as among hills; nor with young and raw troops as with veterans. The great object being not simply to transport men a

certain distance, so much as to present them upon a certain spot in *fighting order*, officers will see the propriety of never willingly undertaking *forced* marches, as the risks of breaking down new troops are too great to be lightly incurred. Particularly is this the case in hot weather, when all the disadvantages in dress and weight, under which the soldier labors, render him doubly accessible to fatigue and disease.* In him the excess of heat at the surface generated by prolonged exercise, finds no ready means of escape through his thick clothing. The weight of the knapsack, and the constriction of the chest caused by its cross-belt, greatly impede the function of respiration, and give rise to acute disorders of its organs. Pneumonia, pleurisy, bronchitis, &c., attest the ill effects that flow from these causes.

When marching under the conditions of a high temperature, the soldier should be allowed to *unbutton his coat*, and to turn down his collar, the distances between the ranks should be widened† to twice or even

* Asphyxia supervening upon extreme fatigue, has been frequently noticed in the French army in Africa, particularly during the prevalence of the sirocco. Even *insolation* has followed upon protracted marching; and in General Bugeaud's expedition in 1836, [illegible] were recorded.

† All who have ever been in a crowd on a hot day, know how suffocating is the atmosphere created by a body of men close together, and radiating about them the corporeal emanations which always accompany even insensible perspiration. But when clothing becomes saturated under such circumstances with visible perspiration, we have here a real human miasma developed, under the combined influences of heat, moisture, and volatilized animal

thrice the usual measure, and he should be relieved of all superfluous baggage; or if that cannot be done, the distances marched should be short,* and gone over early in the day.

The *slow pace* (3 miles the hour) is the proper one for all ordinary occasions, as infantry can then keep up with cavalry: besides which the march is easier for all, and there are fewer laggards. At the expiration of the first hour a halt of *ten* minutes will be found of service.

At the expiration of the second hour a halt of fifteen minutes should be allowed, and the men be permitted to lie down if they choose, unsling knapsacks, unbutton coats, but not to remove them, and take off their shoes. Neither should they be allowed to drink immoderately of cold water from any stream hard by. The canteens should be filled before starting, and suffice until the final halt of the day; and in order to keep their contents cool, they should be covered with a piece of white cotton cloth kept constantly wet. By dipping the canteen in any water during the halt, and allowing a few minutes evaporation from the cloth to occur, the contained water will be found much lowered in temperature. Another halt of ten minutes at

matter. *Thirteen* inches, the space allowed between the ranks, is not sufficient in hot weather, and on a march. Men should never be so near as to *smell* each other.

* All authorities are agreed that when long journeys are to be accomplished, the daily marches should be short. A long one at the beginning has been known to essentially defeat the object of the journey, by breaking down a large number of men, and unfitting them for active duty.

the expiration of the third hour should take place as before. With the fourth hour of march, exclusive of stops, the column will have accomplished from 12 to 15 miles according to the step taken. Twelve miles is considered an ordinary day's march in the British army, and fifteen in the French.* Considering the American constitution as being more nearly allied to the British than to the French, we should say that 12 miles per diem was the extent to which any large column should be pushed during the summer months.

Should the exigencies of the service require that a longer march be accomplished, some additional precautionary measures will be necessary. After having marched the usual time of four hours, the column should be halted for a full hour, the men be made to take off stockings, to roll up pantaloons, and to wash their faces, necks, feet, and legs. After which a ration of bi-cuit and coffee should be served out. By these simple and ever accessible means the men will be sufficiently refreshed to march an hour or two longer without much risk to health.

When making a halt, the officer in command should avoid deep, sandy cuts, or places where there is not a free circulation of air. Open ground, somewhat sheltered by trees, and near running water, is the better place; but as all these qualities are not

* When it is remembered that the soldier on reaching his camping ground cannot at once rest himself, but must prepare his lodgment, procure wood and water, and do an infinity of small duties, not to speak of guard-mounting, it will be seen that 12 miles a day is a sufficient march at any ordinary time.

easily found, the officer will have to exercise his own judgment in all cases relating to choice of localities.

Young troops should, in marching, be placed in the van of the main body. It will be found that they do not experience so much fatigue in leading, as in following the column; and in case of a skirmish, they behave better, and are more self-reliant, from the consciousness of having older troops in their rear to support them. The moral effect thus produced upon young soldiers exerts a direct and dynamic influence upon their physical courage; stimulates them to renewed efforts, enables them to endure fatigue much better, and makes them strive to win the respect of their older brethren in arms, by sharing in common all their labors.

Season and Weather.—The rule of marching with reference to season and weather, should be this, viz.: that in summer the day's march should be accomplished before noon. The same rule holds good when marches *must* be made in wet weather, as that enables troops to collect wood for fires during the afternoon; to provide shelter for the night, and to dry themselves before lying down. As a general thing, however, troops should not be marched, unless the urgency demands it, in wet weather. The dampness of so much clothing, much of it already saturated with organic emanations, the heat of so many bodies marching and perspiring in immediate contact, and the subsequent crowding of half-a-dozen wet, reeking men into one tent with every aperture closed, present all the necessary conditions for the development of

epidemic diseases. We must not be surprised under such circumstances, and when the march is continued for many days, to meet with dysentery and typhoid fever. They are the legitimate offspring of such morbific influences.

Character of Country.—It is easier to make long marches in a hilly than in a level, sandy country. The reason is obvious. The muscles used in walking are not rested simply by inaction, but also by variety of action; and that variety is best obtained by changes in the configuration of the ground over which we march. Besides which, the mind is more stimulated by the variety of scenery afforded it in a hilly country. There is no "weary waste expanding to the skies," around it, to fatigue the eye, and weary the senses with a dull, monotonous sameness. But, on the contrary, every hill-top presents a new vista, and stimulates to fresh exertion. This stimulation, born of a pure, highly oxygenated air, gives elasticity to the spirits, causes the flagging energies to revive, and sends a thrill of ardor through the soldier's heart. It was thus that the view of the plains of Italy from the summits of the Alps fired the hearts of Napoleon's soldiers, and made them forget the fatigues of their hard climbing.

Condition of Troops.—In order to accomplish a successful march, troops should be "fresh" at the start. A great battle, or the execution of laborious field-works, should not be immediately followed by a march of those who have taken active parts in these operations. A day's intervening rest and refresh-

ment will do much towards recruiting the energies of soldiers who have thus exhausted themselves. For although it may at times be necessary to "push on" immediately after a battle, yet it will generally be found that this can only be done with impunity by victorious troops, buoyed up by the stimulus of high spirits. But that great risk of overtasking men is always run in such cases, none will pretend to deny; and while it may be justifiable in the defeated to escape at any and every hazard to health, the same cannot be pleaded by the victorious.

Troops should never be marched *fasting*. A ration of *coffee* and *biscuit*, if time admits of nothing else, should always be served to the men before *starting* in the morning. This is particularly necessary in malarious districts, and should never be omitted. The French will often make a morning march on nothing but bread and coffee. Our troops require more; but without this much at least, they should not be made to march.

Convalescents should be spared as much as possible on the march. Walking is fatiguing enough for them. Their knapsacks and arms should be placed with the baggage, and they near it. In crossing rivers, every precaution should be employed against their being wetted, as this exposure, added to fatigue, would speedily return them to the hospital. Refreshments should also be administered to them during the march, in order to preserve their strength; and at each halt they should, if possible, be allowed to lie down in the baggage-wagons. Extra covering

should be furnished them at night, and they should never sleep without a tent. With these precautions they will be able to follow the march, and even be strengthened by it, so as shortly to resume their places in the ranks. There is not so much danger of malingering among volunteers enlisted for a few months, as among regulars enlisted for several years. Among the former, the desire is rather to push on, than to lag behind. While in the latter, military ardor is apt to become somewhat abated by the feeling that several years of service as professional soldiers still lies before them.

CHAPTER VI.

THE CAMP.

It is unnecessary in a hygienic point of view to speak of all the varieties of camps upon which military authorities dwell. These classifications being purely strategic, have no special application to our subject. We will limit ourselves, therefore, to the two simple divisions of *flying* and *intrenched* camps.

In the FLYING CAMP, which, as its name implies, is to be occupied only for a short period, and where no tents are to be erected, care should be taken to select a spot combining as many of the qualities of *dryness* of soil, proximity to *fresh water*, and *shelter from winds*, as possible. These are the three hygienic elements which should govern officers in the selection of its site. But the short time during which the camp is to be occupied, will not require that the same stringency in hygienic precautions should be enforced as in a permanent camp. Its temporary character relieves it from many of those dangers of epidemic visitation which hover over intrenched camps. Still,

from the greater exposure to the weather in it, sporadic cases of disease will soon appear, if no preventive measures are employed. It is the part of wisdom, then, to provide against these, by hedging the troops about with as many safeguards to health as the nature of their circumstances admits of.

In selecting the site of an encampment, all proximity to *swamps* should be avoided, unless some intervening rising ground, or a dense belt of woods exists, to arrest the current of miasma which constantly flows from them. Experience seems to show that exposed heights, five and six hundred feet to leeward of swamps, are more susceptible to the influences of their miasma than a level or undulating plain half that distance off.* Whenever, therefore, it becomes necessary to occupy such places, fires should be kindled on the windward side, or the men should be made to wear overcoats when mounting guard at night. They should not be exercised fasting, and a more stimulating diet must be given them.

Dryness or Sun.—This is not simply essential, but also indispensable, to the health of troops. Men cannot sleep nor even lie with impunity upon damp ground. Their beds, whether it be earth or board, must be dry, so must their blankets. Double safety would undoubtedly be secured by an india rubber blanket, which neither gets wet, nor allows the dampness of the earth to penetrate it. Hemlock or pine boughs make good enough beds; but even if no contact of the person with the damp earth occurs, the

* Dr. Jackson "On Armies."

emanations from such a soil, particularly in hot weather, cannot be otherwise than deleterious.

Wherever it is permissible, *fires should be lighted* and kept burning all night on the windward side of the camp. They serve, in some degree, to purify the air, (*Est in ipsis ignibus medica vis.*—Pliny,) but, more than all, to temper it. In musquito-breeding or malarious regions, they will be found particularly serviceable.

Shelter from Winds.—This is an important consideration in the selection of a spot for a flying camp, especially when the troops have been exposed to the wet during the day, or the weather be cold. Winds passing over damp clothing, rapidly lower the temperature of the surface of the body, and dispose to inflammatory disorders. It is important to guard against this source of danger by a natural shelter, as well as by fires.

In the Intrenched Camp, which is designed to be a more permanent habitation for troops, other and stricter rules of hygiene must be enforced. In the selection of its site, and wherever practicable, the same considerations as to dryness of soil and proximity to fresh water should obtain. Providing the soil be not argillaceous, the presence of some moisture (springiness) is no cause for apprehension; but the locality of the camp should always be such as to admit of complete surface drainage either by direct flowage or by percolation. The result of all observation shows that a light, sandy soil, bordering on the banks of a wooded stream, affords the healthiest

of all camping-grounds; and in selecting such a site, the medical staff should always be consulted.

The first hygienic requirement in a camp, as in a city, is that its population shall not be overcrowded in its various lodging-places. To prevent this, wherever tents are used, they should be capacious enough to afford each occupant, at the very least, 108 cubic ($6 \times 6 \times 3$) feet of air, with a renewal of 40 cubic feet per hour. The English "Bell" tent with a diameter of 13 ft. 8, and an altitude of *ten* feet, affords to each one of its occupants 146 cubic feet. The Portsmouth hut, which is much larger, and affords room for 25 men, gives to each the same amount (146 feet) of breathing space. Yet large as this seems to be, there is good reason to believe that it is still insufficient in stormy weather, when necessity requires an almost entire closing of the tent. To obviate the risks to health from this practice, they should be made with only partial sides (drops) to be used in slant-wise rains, or fewer men should be assigned to their occupancy. Without some such precautions, tents are apt to become foul to a degree scarcely credible, and in this way to afford nurseries for the generation of epidemic diseases. Authorities differ greatly in their various estimates of the value of tents as hygienic auxiliaries; and certainly, without a more rigid sanitary surveillance than has heretofore been enforced in camps, the evils directly traceable to them have not been unduly magnified. But the same might, with equal justice, be said of tenant-houses; and yet the poor must be *housed*, even at the expense of

health. We imagine the fault does not so much lie in the tent itself as in the mode in which it is occupied, and the want of due ventilation and the negligence in cleanliness among its occupants. When these two objections are removed, we can find nothing in the structure itself to condemn.

Still, it is an undoubted fact that the contact of many warm bodies with the humid earth, as in a tent, by first raising the temperature of the contained atmosphere, and causing an ascent of moisture saturated with organic emanations, produces the best conditions for the development of disease. And those diseases, by the very asthenic and typhoid types which they assume, clearly enough indicate the sources of their origin. The camp dysenteries of the Crimea were most generally of this type, even as all fevers become modified by the medium in which they have been developed, independent of any ingenerate character of their own. The daily observation of such facts as these, multiplied and reduplicated in the hospital records of all armies in modern times, should make us blush with indignation at that stupid apathy which has so long permitted *preventible* disease to decimate the flower of every army.

The late Dr. Jackson, surgeon-general to the British army, was of opinion that tents were not essential to health; and certainly as formerly managed, they were among its greatest enemies. He gave the preference to *huts*, alleging their superiority on the point of cleanliness and ventilation, and even asserted that men could do well without either. We are

not prepared to say as much as that, believing as we do in the superiority of a well-ordered tent over all other kinds of shelter. But for safety's sake it should only have *partial* sides, not close walls, a trench dug completely around it to receive and lead away the rain; and not less than *four* feet should intervene between the stakes of each tent.

Every occupied tent, at night, should have a large portion of its doorway, or during a storm some other aperture on the leeward side, open, for purposes of ventilation. The corporals of each guard in making their rounds should see to the enforcement of this rule, also that the men do not smoke in the tent. It would also be well, were it possible, to insist upon the men's blankets being inspected at night to see that they are not *wet* when used as coverings. And when the guard is relieved in rainy weather, and before a soldier retires to his quarters he should, if he has used his blanket, be given a dry one in exchange, in which to sleep.

The floor of each tent should be covered with an india-rubber, or painted canvas cloth, which should form part of the camp-equipage just as much as the tent itself. In this day of meridional civilization, it is unjustifiable to omit any thing which can protect troops from the risk of sleeping on damp, cold ground. Tents must have floors; wood is cheap, but bulky to transport, and, besides, becomes saturated with organic emanations. India-rubber, on the contrary, is cheap, light, and always clean.

To each twenty men there should be allowed a

night-bucket with a cover, to serve as a *urinal, and to be used only at night.* This is cleanlier than to allow men to ease themselves on the ground in the vicinity of the tents, (as the soil soon becomes foul and offensive,) while, at the same time, it relieves them from the necessity of going to the privies at the extreme rear of the regiment in wet and stormy weather.

The regimental privies or sinks should be encircled by bushes, and every evening a portion of the earth dug out of them should be thrown in. A *special privy should be allotted to the dejections coming from hospital patients;* and this should, when much sickness prevails, be daily disinfected.

Every tent should be thoroughly aired daily; and all straw, hay, or other bedding contained in it should, on every fair day, be taken out, and aired in the sun. But whenever the same becomes mouldy or offensive by age, it must be thrown away. The blankets of the men should also be daily aired and sunned.

Once a week they should be made to wash themselves and change their body clothing, and an opportunity be also given them to wash their soiled clothes. Regular wash-days, for this purpose, when practicable should be appointed, in order to avoid the accumulation of soiled clothing in the tents.

At least twice in every week, the surgeon or his assistant should make a sanitary inspection of all the tents, kitchens, and sinks throughout the camp. Each company should detail two corporals to attend

him in the inspection of its own tents. Neither the day nor the hour of the inspection should be announced beforehand.

The medical officer, at the same time, should inspect all provisions in actual use; the barrels, boxes, pots, or cans in which they are kept; and the power should be given him to order any thing to be destroyed with whose sanitary condition he is dissatisfied.

Guard-Mounting.—As sleep is among the most indispensable of our necessities, so its loss is followed by a degree of lassitude and discomfort amounting in many to actual suffering. Although all do not immediately experience the same ill effects from its loss, yet practically the effect is in the end the same, whenever the absence of sleep is protracted. The young and the weakly succumb first, the mature and the healthy follow them also at no inconsiderable interval of time. Superadded to the fatigues of the day, the duty of mounting guard is, among young troops, the severest task which can be imposed upon them. Nothing, in fact, will sooner destroy the health of youth than privation of a due amount of sleep; and it is on this account that it becomes important to allot the duty of guard-mounting to those who can stand it best.

As a hygienic rule founded in a strict economy of strength, the youngest troops (from 18 to 21) should not be put on guard at night after a march, or battle, although they may, when a regiment is permanently encamped. But in any event, the first

hours of the night should not be assigned to them. The mature of age are more wakeful during the early part of night, while the young are more disposed to sleep. Hence the young should be put on duty during the last watches of the night, and when they have already received all needed benefit from sleep. The older men will, in like manner, receive their measure of rest at the time when nature most prompts them to seek it, so that by thus following the dictates of natural appetites the health of all classes may be preserved.

Sleep is, indeed, such an imperative necessity with the young, that to rob them of it is to strike the most cruel blow at their physical vigor. The loss of a meal, or a long march, will not produce such depressing effects upon their health as the loss of one night's sleep. And the nervous energy being thus lowered in tone, the system becomes readily accessible to the seeds of any endemic or epidemic malady. It is rendered more sensitive to the impressions of cold, to the influence of malaria, and, in fact, to all extraneous circumstances. Timely circumspection on the part of officers is needed here, to prevent injuring troops, which, surrounded by all other hygienic conditions, may yet, through a negligent disregard of the proper allotment of sleep necessary to meet the requirements of different ages, be debilitated and unfitted for the successful performance of their duties in the field.

CHAPTER VII.

THE FOOD.

The diet of the soldier plays an important part in the economy of his military life. For, in contradistinction to the civilian, it is not sufficient that his food should simply sustain life, but it should also be possessed of such qualities as to develop in him a high degree of animal spirits. It should give vigor to his health through appropriate stimulating virtues, and leave behind a measure of positive strength due to its inherent tonic properties. All have observed the diversities which national character assumes under varieties of diet. The difference between the *meat* and *wheat*-fed European, and the *rice*-fed Hindoo; the *maize*-fed Mexican, and the *fish* and *yam*-fed South Sea Islander, in all the qualities of intellectuality, strength of body, and persevering energy and endurance, is too marked to have escaped notice. It may be stated as a universal rule, that the conquering races of the earth have always been the best fed races, not indeed in the sense of luxurious indulgence, but in the possession and use of those aliments which

impress upon the system a vigorous tone, and thus develop physical courage. The same rule also obtains among animals. The high bred hunter, the racehorse, or the roadster, all attest through the manner in which they do their appointed work, the tonifying quality of their diet.

All these truisms point directly to the necessity of making the soldier's dietary an important part of the discipline of an army, as well as of its hygiene. In an economic point of view, it may be said that a weak soldier is no soldier, costing the state more to support him than his services are worth. True wisdom, and true economy, therefore, lies in furnishing him with such qualities of aliment as will keep his physical energies always at par. His life is peculiarly exposed to incessant causes of debility and to attacks of disease. He is suddenly translated from civic life, with its regular, generally controllable duties, to a military life with its fatiguing drills, marches, guard-mountings, irregularities in times of occupation and eating, overcrowding in tents and barracks, exposure to heat and moisture, and vicissitudes of climate, all of which none will certainly pretend to say are calculated to strengthen, so much as they are to shock, and to enfeeble the system. Such an individual of all others, needs a tonic and recuperating diet, and unless he finds it, very soon takes his place in a hospital ward with broken health. It is far cheaper to feed him well in the field than to nurse him in the hospital.

In order, therefore, to be serviceable to the state,

soldiers must be fed well. In order to enable them to bear the fatigues of marching, to breast the vicissitudes of weather, and to encounter, unaffected, the changes of climate, their bodies must be nourished with particular reference to developing a high muscular tone. Experience has shown that a *mixed diet*, in which animal food preponderates, is that most conducive to this result. Consequently it is to such a form of diet that we must look for maintaining the health and utility of an army. Nothing is more true than that good food is as much a munition of war as good powder.

On examining the bill of rations of our army, two important facts strike us at the outset. The first is the narrow range of the dietary, amounting in its monotonous uniformity almost to *exclusion*, and second its too often *unreasonable* character. Now, in these days of easy transportation, there is clearly no justification on the plea of economy for either, while science and experience conspire to condemn both as the fruitful sources of mischief to health. There is an instinctive craving for variety of food in all organisms, and however good any single article may in itself be, its continued and exclusive use for any length of time is sure to inspire disgust, and consequently to impair its nutritive character. In such cases men may be filled with it, and yet not fed by it, because nutrition depends upon assimilation, and assimilation upon that tone of the digestive canal which manifests itself through taste and *relish*. What we cease to relish we are neither apt to assimilate,

nor to be nourished by. The very craving for variety in food is thus made an index of the necessity of a change in its character to our organism.

Again, we may have, relatively speaking, a strong diet at any period of the year, but in order also to be a healthy one, it must conform itself in a measure to the requirements of the season. Hence, in an army, every thing, whether labor, food, or clothing, should be regulated first of all by the necessities of the season. And inasmuch as most campaigns, or active operations in the field, take place in summer, and may, besides, extend into hot climates, the soldier's dietary should be so arranged as to enable him not only to meet the exigencies of his own laborious calling, but also to resist the constitutional influences of a debilitating season. The object should be to have each article nutritious, without at the same time inducing any predisposition to diseases of the season. In a word, the dietary should be both alimentary and corrective.

A diet consisting simply of flesh and cereals, although eminently nourishing, could not be endured throughout the summer with impunity. And if that flesh were salted, it would greatly increase the tendency to disease. The proximate principles of organic matter must always be present, but they should change their proportions and relative position in the scale of our rations to meet climatic variations. As now established, the soldier's fare is a true winter diet, and rich in elements well suited to meet the requirements of respiration, under a low temperature.

In summer, on the contrary, the excess of carbon furnished by it to the lungs beyond what they can dispose of, imposes additional duties of elimination upon the liver, and tends unduly to excite this organ. A predisposition to biliary disorders is consequently engendered.

In order to counteract the ill effects of so alkalescent a diet in summer, recourse must be had to fruits and vegetable acids. These, with spices, are nature's own correctives. Both, also admitting of preservation, should be regularly included among army supplies. By a proper disposition of his diet, man lives as healthfully under the equator as under the pole. The East Indian with his rice and yams, and the Esquimaux with his seal-blubber and putrid fish, are both healthy enough in their respective climates, but let them once change residences without changing their diet, and what would be the consequence? The Esquimaux would be attacked with putrid fever, and the West Indian would die of inanition.

We perceive from this the absolute necessity of modifying all forms of diet in such a way as to accommodate them to the physiological requirements of varying seasons. For habit is not acquirable as against the laws of chemical combination, and no man can become habituated to doing that with impunity, which, being a violation of the physiological laws of his system, is, by its frequent admonitions of pain, notifying him of the evil about to overtake him.

As the ration bill now stands, it presents us with too concentrated a form of diet for continued

use. It abounds in *fibrine*, *gluten*, and *fat*, without, however, a sufficiency in *starch*, *mucilage*, *gelatin*, and *acids*. *Aromatic herbs* and *spices*, without which health cannot for any length of time be preserved, particularly in hot climates or seasons, are entirely omitted, while *fat pork*, an article contra-indicated in summer both by the state of the appetite and the physiological necessities of the system, stands as the sheet anchor of its animal food. Lean hams, shoulders and sides, or jerked beef, should be substituted in its stead. In the arrangement of the summer dietary, it should be remembered that animal *fats* must take a subordinate rank, and *starchy* food, *esculent* roots, *aromatics*, and *vegetable* acids be allowed to preponderate.

It is not from the *quantity* of food digested, so much as by the power of assimilating it, that mankind are nourished. A pound and a half of pork or beef per day would sicken and debilitate the Arab whose handful of dates enables him, between sun and sun, to perform fatiguing exercises; while the same amount of flesh would hardly suffice to keep alive an Esquimaux bantling. The reason for this difference rests solely in the function of assimilation, a function which is of all others the most speedily affected and deranged by too exclusive and concentrated a diet. The story of the peasant who broke his thigh, and while in the hospital fell into a complete *marasmus* when fed on beef-tea, custards, rice-milk and wine, and only recovered when restored to his original diet of black bread, greens, fish, and oil, is a pointed illus-

tration of the *innutritious effects* of too *nutritious* a dietary long persisted in.

Now, because soldiers have hard work to do, we must not imagine that all they require in food is simply what chemists have ascertained to be *nutritive* reparative qualities. They cannot be fed like steam-engines, by just so many pounds of this or that kind of fuel daily and unvaryingly administered. A man losing 2 or 3 pounds in weight by perspiration to-day, could not be restored to-night by simply gorging him with a like weight of beef, pork, or bread. In the presence of vital forces, the conduct of organic functions cannot be regulated by chemical formulæ born of the laboratory. No narrow methodism is tolerable here. We must follow experience alone; and experience everywhere shows that in the healthy health is alone to be preserved by a *liberal, mixed diet*. If we would preserve the health of our troops we must amplify the range of their dietary. It may cost a little more, and but a little more, yet that little is an hundred per cent. less than the cost of nursing a sick man, paying him wages besides, and over all, losing the benefit of his presence on the battle-field. We fancy that no economist would be long in determining which measure of the two is cheapest in the end.

Experience having demonstrated that no single substance, be it animal or vegetable, when exclusively indulged in for any length of time, can support the human body in health, but that the continuous use of the same food produces debility of the digestive ap-

paratus, satiety, and consequent faulty nutrition, it becomes indispensable to the health of soldiers that each meal should be composed of a due admixture of *animal* and *vegetable* substances, and further that the dietary should be so arranged as to avoid repetition and *sameness* in the articles daily used.

It is also established that, in order to maintain healthy digestion, all alimentary substances should occasionally be accompanied by condiments of a *saline*, *spicy*, or *aromatic* and *acid* character. Salt, pepper, and the aromatic principles of certain vegetables like onions, parsley, thyme, and garlick; the spices proper, cloves, ginger, &c., or the vegetable acids, sorrel, vinegar, &c., when taken in concert with our food, tend to promote its more perfect elaboration, or to correct a disposition to fermentation and putrescency.

In a country blessed with plenty like our own, with means of transportation at every door, and where almost every village sends its company of volunteers, it is not difficult to provide a dietary like that which follows. The articles superadded to the regular army rations could be easily made up for each company *in its own home*, and forwarded to its quarters in the field. Thus barrels of apples, potatoes, onions and carrots, where troops are at a depot, might easily be sent them. It is understood that the Government makes no objection to their transmission, and nothing but willingness is therefore wanted on the part of patriotic committees at home.

In alimentary rank animal food must take pre-

cedence of all other kinds. Next to this come bread and farinaceous articles, and lastly esculent roots and spices. The order of their disposition in any dietary should be nearly as follows:

FOR A WINTER DIET.	FOR A SUMMER DIET.
Pork, 3 days in a week.	Beef, 3 days.
Beef,* 3 days in a week.	Mutton, 2 days.
Mutton, or Salt Fish, 1 day in a week.	Pork, or Salt Fish, 1 day.
Flour,† Wheat and Indian.	Flour.
Beans, 2 days in a week.	Beans or Barley, 1 day.
Potatoes, 2 days in a week.	Rice, 3 days.
Esculent Roots, Pickled Cabbage, and Dried Fruits, 3 times a week.	Dried or fresh Fruits, or Pickled Cabbage, 4 days.
Coffee, twice daily.	Coffee, twice daily.
Sugar—Spices.	Sugar—Spices.

With regard to *quality*, it may be said that *fresh* meats are always more nourishing than salt, dried, or

* The cheapness of beef in our country renders it unnecessary that I should say aught on the subject of *horse-flesh*, now so much in vogue in some parts of Europe. It is unquestionally proved to be highly palatable, nutritious, and in no wise inferior to beef as an article of alimentation. Philosophers have fed upon it, and detailed with rapture its good qualities, and one of them, Geoffrey de St. Hilaire, has consecrated its merits in a volume of considerable size.

† It is more economical, as well as healthy, to feed soldiers on *stale*, rather than on fresh bread. Less of the former is apt to be eaten, and less suffices to nourish them. By stale is to be understood bread which has been out of the oven, and exposed to the air *at least* 24 hours.

It would be better also if the bread could be made of *wheat-middlings*, instead of fine flour, as a large percentage of nutritive matter (gluten) is removed with the husk in the process of bolting. Indian meal should also be occasionally mixed with fine flour in

smoked, which latter are also more indigestible. That the flesh of grown animals exceeds in nutritive value that of the young, and that moderately fat meats are the best of all.

With regard to vegetables and fruits the same rules apply, to a certain extent. Fresh vegetables are always preferable to dry or preserved ones. Farinaceous vegetables like potatoes, beans, and peas, are more nourishing than roots and grasses, such as cabbage, spinage, &c. Nevertheless, the system occasionally requires such articles as cabbages, turnips, onions, carrots, &c., and their peculiarly *corrective* qualities are called for to mitigate the scorbutic tendencies of too exclusive a diet of salt meat.* The acid fruits, like dried apples and peaches, when fresh ones cannot be obtained, should find a regular place in the

making bread. The popular aversion to dark-colored bread, founded on the supposition of its lesser amount of nourishment, is a gross error. The best soldiers in the world are fed on dark-colored bread.

The importance of *good bread* to health is so universally recognized that I have deemed it unnecessary to say aught upon the subject. There are frequent enough complaints about the quality of the beef issued to troops, but I imagine that there is full as much dereliction in the matter of bread. Now, certainly, there can be no excuse for either, although, of the two, I entertain no doubt that bad bread works more silent mischief than bad beef. And if this be so, it becomes the duty of medical officers to provide some remedy, in the form of instruction to cooks on the philosophy of bread-making.

* The virtues of *saur-kraut* as an anti-scorbutic are well known, and although its smell (due to the presence of valerianic acid) is undoubtedly unpleasant, it deserves, in a sanitary point of view, a place in our army dietary as a condiment of much value.

soldier's dietary. Vinegar, as with salt and pepper, should never be wanting. Nor should the aromatic spices, cloves, ginger, and cinnamon be overlooked. They play an important and hygienic part in the domestic economy of the camp, and should not be restricted to the medicine chest of the surgeon.

But the virtue of food, however good, may all be destroyed by bad cooking. And this time-honored observation has led to the belief among many that while the Spirit of Goodness sends the food, the Spirit of Evil sends the cook! Be this as it may, the manner of preparing the food of soldiers is one of the most important of considerations, and as such deserves notice in this connection.

The French, who have systematized everything down to the nicety of a mathematical proposition, insist in their army dietaries that the best possible preparation of animal food is in the form of soups. Roasts and stews with them only claim a secondary position. But in their field soups besides meat there are always vegetables introduced. We have then what New-Englanders call a *boiled dinner*. As a general rule it may be said that when soup is properly made, it furnishes us with all the nutritive elements of both flesh and vegetables contained in it. It presents to us animal juices in a state of solution, together with the mucilage of vegetables, and the sapid principles of both. But this highly concentrated form of nourishment should be qualified by consuming the now almost innutritious flesh and vegetables with which it has been made. We need the *bouilli*, or the

woody fibre of the vegetable after partaking of the soup, because we need bulk as well as nourishment in our food. The intestinal canal must be distended as well as stimulated. Bread, also, should be eaten with it.

In making soups, good cooks say that the meat should be put into *cold* water, in quantity sufficient to be reduced *one-third* by boiling. The water should not at any time boil violently, but *simmer*, for from 4 to 5 hours, and no more must ever be added after the soup has begun to boil. Vegetables should be introduced for two purposes, viz.: to increase the nutritive qualities of the soup, and to flavor it. A knowledge of this fact will enable the mess-cooks to regulate suitably their proportions. Baked meats are more economical than broiled, or those roasted in the open air, both which lose by these last-named processes some of their nutritive qualities. All stews made of beef, mutton, or pork should be accompanied by appropriate vegetables and condiments.

Whenever practicable, fresh fruits should be allowed the men, in lieu of vegetables, but never in lieu of animal food.

As to beverages, coffee being a *regulation-drink*, and like water always to be had, nothing need be said on that score; but there are others which, under certain circumstances, are called for as a hygienic safeguard.

EDUCATED COOKS.

It is somewhat singular that, although the importance of good food to health is everywhere acknowl-

edged, and the evils consequent upon ill-cooking are everywhere deplored, no means are yet adopted to remedy the latter by providing a corps of scientific cooks for our armies. The anathemas so constantly launched against the commissariat department for not providing the raw materials of good quality, might with great justice be distributed, in perhaps the largest measure, over the department of *kitchens and cooks*. Administrative vigilance limits its efforts to furnishing a due quantity of supplies, generally of an indifferent quality, and there rests. How the food is cooked, or whether it be cooked at all, is apparently a matter of perfect indifference to all in authority. The inconsistency manifested by such conduct is little short of criminal, for it is in every sense a neglect of one of the most efficient means for preserving the health of armies. In any other of the details of military service no similar degree of negligence would be tolerated. Were so many hundred pounds of powder to be issued to make so many thousand cartridges, no commander would rest satisfied with the report that the powder was dry, and of good quality: he would insist upon knowing who were to make the cartridges—whether the workmen had the necessary tools given them, and whether they possessed the requisite skill. He certainly would not allow the unlearned to take part in the operation, except under the eye and direction of competent instructors.

Now some similar degree of vigilance is precisely what is needed in the culinary department of armies. We need, and we must have educated army cooks, in

order to prevent disease, waste of food, and to extract the best possible good from it. Soldiers must be fed and nourished, as well as filled and distended by their rations. They are not anacondas, or ostriches, whose digestive organs can dispose of any thing that may be presented to their action. Hence boggy-bread, and leathery beans have killed more troops than bullets, and they will continue to do so, until some radical reform is introduced into regimental kitchens. It is idle to seek for probable causes of disease, in air, water, or earth, *outside* the camp, when so permanent and manifest a cause is assiduously at work *within*. The work of purification and prevention must begin *here*. The kitchen must be ennobled into an institution of science—of systematized intelligence, and of skilful adaptation of means to ends. In fact, cooks must be honored by an education in the chemistry of their own specialty. They should be taught the *how* and the *wherefore* of their art, and be elevated above the ignoble craft of scullions by a course of training calculated to win respect for them in the eyes of others.

Every company should have one *educated cook*, whose duty it should be to attend to nothing but the kitchen. He should be considered a non-combatant, and always retained as such. An assistant should be given him, but the cook alone should be responsible for the good dressing of the food.

Some such regulations as these would, if enforced, insure to each regiment a body of disciplined cooks calculated to promote in a very high degree the com-

fort of the men, and to preserve their health, by protecting them from the evil and insidious influences of bad cooking. And when the good results which may be thus secured at so cheap a cost are considered, it would seem as though it were only necessary to point them out in order to have instant measures taken to obtain them. It is certainly time that something were done in the matter. Humanity, no less than economy, is interested in the subject; for inexorable facts show that the dietary of troops is one of the chief avenues through which disease assails them, and that dietary, as all know, depends for its influence upon health, almost as much upon the mode in which it is prepared, as upon original qualities.

CHAPTER VIII.

THE CLOTHING.

The clothing of soldiers, until recently, has never received that attention which its great importance deserves. The idea of its character, which obtained up to the middle almost of the present century, was evidently an inheritance of the past, and transmitted to us along with the legends of Wellington and Napoleon. A soldier, in those days, was a man in "brass and buckram" of formidable aspect, truly, but set in so thick a harness of padded cloth and leather, and so encumbered by the weight of arms, and of his clothing, as to labor under every possible disadvantage in a fight. Constrained in every effort by the *style* of his clothes, and oppressed on all sides by the unrelenting burthen which they and his arms imposed upon him, he could never be considered otherwise than an oppressed and fatigued man. Every thing in his equipment seemed calculated to obstruct freedom of motion and to impair his ability of performing muscular exertion. It seemed singular, indeed, that men whose duties called for the

greatest agility, whose lives and whose successes depended upon the free use of every muscle, should by positive enactment be encased in a harness calculated to interfere with every extensive motion.

The terrible realization of this error was never forced upon European commanders until the French undertook the conquest of Algeria. There, the manifest advantage of lightly clad and armed troops over heavy ones was found to compensate almost for the deficiency in their military skill and discipline. Not alone on account of the climate, but also to remove every obstacle to agility which the French at once perceived was the strong point of all Arabic effectiveness, they proceeded to modify the dress of their army. An entire change of costume was the consequence of this observation. Every thing *heavy* and *constraining*, or *impeding* in any way the free movement of any muscle in either arm or leg, neck, shoulder, or back, was discarded. Loose pantaloons, and jackets, small collars, or none, light kép's instead of heavy shakos, shoes in the place of boots, lighter rifles and muskets, took the place of the former heavy arms and accoutrements.

The world now recognizes the wisdom of this change, and is everywhere hastening to adopt it. Heavy, tight uniforms are giving place to light ones. The idea that either warmth or durability are dependent upon weight is exploded. We have, at last, made our exodus from this vestamental Jericho.

The first necessity of all dress is *warmth*, next to that, *lightness*. These two conditions are best ful-

filled by *woollen* fabrics. Both the under and the outer garments of the soldier, therefore, should consist of this material. It is not necessary here to speak of the advantages of woollen over either cotton or linen. The world decided that ages ago.

UNDER GARMENTS.

Both in summer and in winter, in the tropics and under the pole, wearing flannel next to the skin has been found a protection to health. And except in extraordinary cases, and where some cutaneous idiosyncrasy forbids its use, troops should be made to wear it *night* and *day*. Where a whole waistcoat cannot be endured, a flannel *apron*, or *bandage*, covering the abdomen and loins, should be worn in like manner. Incipient diarrhœas and dysenteries are by this means often averted. Of the flannel bandage no praise, in fact, can be fulsome; it is the best friend of the soldier in all climates and seasons, and no one should ever go without it.

Besides the waistcoat, light flannel drawers should also be worn. These may be made of *cotton* flannel, which shrinks less, and for this purpose wears better than ordinary woollen flannel. Woollen socks are also necessary articles to health. But where any specific cause exists why they should not be worn, as by causing excessive perspiration and tenderness of the feet, thick *cotton* hose should be served out in their stead.

OUTER CLOTHING.

Inasmuch as regulation prescribes what this shall be, little opportunity is afforded us to say aught touching either the pantaloons, the jacket, or the overcoat. Of the necessity, as well as the advantage of their being loose, we have already spoken. But there is a subject connected with the uniform of soldiers, whose importance demands a passing word even at the hands of hygiene. That subject is its *color*, in relation both to warmth as well as conspicuousness.

Color plays an important part in the clothing of the soldier in two ways. First, as receiving and retaining more or less of the sun's rays, and being on that account *hotter*, and second as presenting better or worse marks for an enemy's aim. In relation to heat, it is well known that black or any dark colors are particularly absorbent of the sunlight, and consequently make very hot clothing. The manifest impropriety of selecting such colors for summer wear, unless, as in the zouave, the jacket is left open, becomes apparent to all. Such clothing are simply *sweltering* clothes, and harass the soldier unnecessarily. The Arabs, daily exposed to the sun, wear a *white* bournouse, which, although made of woollen, is not in the least oppressive. A tight dark garment would be intolerable in their climate. But white cannot be kept clean, besides which it is too glaring to the eye, affords too good a mark to the enemy, and is therefore objectionable. The same reason applies to red.

Gray, *buff*, or any neutral tint, presents us with the best requisites for a uniform.

But the second aspect under which color can be viewed in relation to uniforms, is that in which it presents itself as a mark for an enemy's aim. The least possible thought upon the subject will convince us that all brilliant colors, red, orange, white, are, from their high reflective powers, visible at great distances, and consequently a fair mark for sharp-shooters. Therefore pickets, guards, and skirmishers should wear clothing of a more sober and neutral tint. Statistics declare that for every 12 men in *red* who are struck in an engagement, there are only 7 in *green*, and 5 in *gray*, thus showing the decided advantage of this last color over all others in point of immunity. These simple facts should be allowed to have more weight than they do in the uniforming of volunteer regiments, and surely, if color can in some degree prevent liability to bullet-wounds, and thus diminish the ratio of an army's mortality, hygiene does not transcend its province by calling attention to the fact.

The very small size of the képis and its closeness to the head, by forbidding all circulation, and keeping a heated cloth in contact with the skull, greatly predisposes to accidents by sunstroke. To prevent this, the so-called Havelock cap, or helmet of white linen, with a tail-piece shielding the entire neck, is a most desirable invention. This cap is worn by the British army in India, and proves an effectual protection against sunstroke. It should be at once adopted among our own troops.

Shoes with gaiters are the most desirable of all foot coverings for soldiers. They are lighter than boots, allow more freedom of motion to the ankle, and do not occupy so much room in the knapsack. The confined atmosphere of the boot, which under exposure to the sun becomes insufferably hot, keeping the foot in a vapor bath, and acting almost like a blister upon it, is entirely avoided in the shoe. The use of boots, in fact, should be prohibited to soldiers, as wearing them on a long march certainly impairs the soundness of men's feet. In summer, a white canvas gaiter should cover the shoe, as well to protect the foot from the sun, as to prevent the dust from entering it while marching.

CHAPTER IX.

ON THE PREVENTION OF DISEASE IN GENERAL, AND THE INDIVIDUAL PRESERVATION OF HEALTH.

Although what has been said in the foregoing chapters relates to the care of troops, and the maintenance of a better state of health among them in the various circumstances of their active life, I have still thought that it might be advisable to devote a special chapter to *the prevention of disease, and the individual preservation of health*, as furnishing suggestions for general and individual guidance under the ordinary necessities of a soldier's existence.

GENERAL GUIDANCE.

CLIMATE.

The sudden changes of climate to which soldiers are exposed in a campaign, are among the most important of the causes prejudicial to their health. When it is remembered also that climate does not so much depend upon latitude as upon the physical character of locality, it will be perceived that it is not

necessary to transport troops many hundreds of miles in order to bring them under the influences of an entirely different clime. A change of a single degree in latitude may bring us where the nature of the locality, the soil, the character of the vegetation, and the prevailing winds, are as a foreign clime to our constitutions; while, even in the midst of a tropical climate a towering mountain will present us with zones of temperature varying from that of its base to that of the Arctic regions. Altitude is therefore a modifier of latitude. The climate of Vera Cruz and the *tierra caliente* is so entirely different from that of other places in the same latitude, but situate high above the level of the sea, that the inhabitants of these latter regions cannot enter what is to them, the *foreign* climate of the coast, without suffering from endemic fevers; and the same may be said of the inhabitants of the mountains bordering on the Roman campagna.

Observation shows that along the sea-coast and the borders of rivers, in the southerly part of temperate climates, the daily evaporation from the surface is productive of heavy dews, more or less laden with the products of decomposed vegetable matter. Where land-winds also habitually prevail, these products are dispersed over regions remote from the centre of their production. Contaminating effluvia are thus transported into the atmosphere of localities free from any internal sources of malaria.* Low grounds

* Dr. Ferguson was of opinion that the intermittent fever at Edinburgh was due to malarial poison wafted from Holland.—*Phil. Journ. Med. & Phys. Sci.*, No. 16, p. 374.

covered with vegetation, and bordering the sea-coast or the river-banks of southerly countries, whether they be actually dry or not, are always to be considered malarious regions, as towards new comers from the north.

Deep valleys or bottoms, where the diurnal variations in temperature between noon and night are noticed to be great, (from 15° to 30°,) may also be placed in the above category.

Situations at the foot of a mountain immediately rising from a low plain bordering the sea, are also objectionable.

Rains in all warm climates greatly increase the disparity of the temperature, and even in a single day may excite dysenteric affections. For this reason, the farther south we go the more protection we need against moisture, whether in the form of dew or rain.

The greatest liability to malarious poison (paludal intoxication) occurs when the equilibrium of the atmosphere is in a state of disturbance, as during some two hours after sunset, and two before sunrise. Within these intervals troops should not be exercised nor kept fasting. Breakfast should precede the performance of any morning duties, and supper should be eaten at sunset.

In order to acclimate an army with as little sickness as possible, it should enter the foreign clime at that season of the year which can most gradually introduce it to those extremes of heat or moisture, that mark its character. By doing this, all suddenness

of transition is avoided, the clothing is not immediately obliged to be changed, nor the diet; the system gradually accommodates itself to the change in functions required, and the sickly season, when it does come, is met by constitutions already so much modified as to have lost much of their impressibility to endemic causes of disease. The ratio of sickness will always diminish in proportion to the degree of acclimation attained.

There are a number of duties occasionally devolving upon soldiers which, from the infrequency of their occurrence, are peculiarly distressing to those who undertake them. *Digging trenches, building bridges and causeways, making roads*, and the like, impose severe tasks upon soldiers. Yet these duties are at all times indispensable to the successful passage of an army through an enemy's country, and they must then be performed at any and every hazard. Their execution involves two of the most perilous conditions to health possible, in the form of great fatigue and exposure to terrene exhalations. Without some precautionary measures, this kind of duty affects the health of the soldier more than any other single cause, and when in particular the task is performed in a climate to which troops are not indigenous, visitations of disease may be speedily expected.

As a rule, therefore, whenever troops enter a foreign climate,* and until some considerable time

* I need hardly remark that our Northern troops, in passing now no farther south even than the lower Chesapeake, will, enter a climate entirely *foreign* to their constitutions, and that, too, at a season most likely to impress its character upon them. Thus,

has elapsed, they should not be called upon to make excavations, or greatly disturb the soil in parts not inhabited, or already brought under cultivation. If it becomes necessary to order such labor done, natives, when they can be employed, should undertake the task. For experience proves that in all alluvial districts the disturbance of the soil for the first time by the unacclimated, is sure to invite an attack of malarious fever. But where natives cannot be found to do the work, men should be selected who have come from adjoining districts, the chance of immunity always diminishing in the ratio of the distance of their usual habitations.*

Whenever troops are stationed either on the seaboard, or in malarious districts, their diet should be increased in quantity; overcoats should be worn at night, when on guard; and no out-door morning

New Englanders and New Yorkers will have traversed from five to eight degrees, and the men of the Middle and Western States from one to five degrees. From certain resemblances in soil and climate, it is probable that men bred in the great valleys of the Ohio and Mississippi (Missouri, Kentucky, Illinois, Indiana, and Ohio) will be less affected by these changes than those from our Northern seaboard States. It will be well to consider these things in garrisoning posts in the South, particularly in the low, alluvial regions bordering on the sea; or in the vicinity of lagoons, and the deltas of great rivers.

* Wherever great fatigue and continued exposure become inevitable in malarious districts, it might even be well to anticipate attacks of intermittent fever, by administering to those who are particularly exposed, a *one-grain* pill of the Sulph. Quinæ every morning fasting. M. Du Chaillu, the African traveller, assured me, that, by following this course, he had been enabled to traverse the most malarious intertropical regions with comparative impunity.

duties should be exacted of the men while fasting. Coffee should be dispensed to all who have returned wet and fatigued from mounting guard, or any other protracted exposure at night; the great object being to protect them against repressions of circulation due to the differences in temperature between midday and midnight.

Men, passing suddenly from a northern to a southern climate, suffer at first a sort of general erethism. Their systems are surcharged with heat, the blood is expanded, and there is fulness of the capillary circulation. If, now, they are exposed after nightfall to heavy dews and a temperature from 15° to 30° colder than the day, it is easy to divine what must happen to systems thus highly excited. "Cold," says Dr. Mosely, "is the cause of almost all the diseases in hot climates, to which climate alone is necessary." And cold acts upon the nervous system precisely as does the malarial poison, by depressing its tone, and lowering the functional activity of the large organs. Whenever soldiers have been thus circumstanced, and an incipient chill is felt, they should immediately, on returning to their quarters, lie down with additional covering over them, and endeavor to provoke a gentle perspiration. The sooner this is done, the less will be their liability to permanent disease. Every hour of omission aggravates the character of the disturbance, and that which was simply a slight chill, which a cup of hot coffee or a thick blanket could have dispelled, may soon pass into a form of obstinate and complicated fever.

When on guard at night, the best protection against sluggishness of the circulation is to keep the mind *active*. Be wide awake. The overcoat imparts no heat to the body—it only serves to retain that which is already there. The generation of it must come from within, and there is no better steam-engine for the human body than an active and thoroughly self-possessed mind, determined, by a concentration of all its energies, upon the task before it. Men exposed in the Arctic regions, never freeze to death so long as the mind is active, but the moment it goes asleep the body becomes fatally chilled. An active mind serves also to repel disease, and thus to preserve health. It is the conservator of the equilibrium of the vital forces, and regulates the measure of their activity.

After every exposure to wet, particularly at night, the men should be served with a ration of hot coffee, or ginger tea, and care should be had that they change themselves so as to sleep in dry clothes. And owing to the difficulty of drying clothing in a soldier's tent, each company should set apart a tent for this express purpose. The noisome smell, and the dangerous consequences to health, arising from keeping wet clothes saturated with organic emanations in an inhabited tent, cannot be exaggerated by any recital of ours. Proper drying quarters should, therefore, be provided.

Whenever an epidemic declares itself in camp or at a post, all ordinary precautions must be doubled. Active duties must be diminished in their duration,

fatigues avoided, periods of guard-mounting lessened, and modifications made in the dietary, if deemed necessary by the medical officers. A sanitary squad, under the command of a surgeon's mate, should be organized, for the purpose of daily inspecting all tents, huts, barracks, kitchens, wells, and sinks. And a daily meeting of the staff and medical officers should be held, to hear reports upon the progress of the disease, to receive suggestions, and exchange opinions upon its origin, history, and character, and to promulgate orders for its speedy control and eradication.

Skirmishers are often almost at great distances from the camp, are scattered in small parties over a large extent of territory, and cannot, if wounded, immediately receive that medical relief which their case requires. They may be miles away from the main body, their own surgeons cannot be everywhere at hand to assist them, and hours may elapse before help can reach them. On a lone mountain-side, in a swamp or a thicket, the skirmisher may fall and perish, as hundreds have before him, undiscovered and unassisted.

"For want of timely aid
Thousands have died of mortal wounds."

In order to provide against these contingencies, there should, to each party of sixteen skirmishers, be given a small hospital knapsack containing field tourniquets, lint, and bandages, the carrier of which should be instructed how to use them.

INDIVIDUAL GUIDANCE.

The soldier, like the sailor, is proverbially careless of himself. His life, he appears to think, belongs to no one but the state, and he accordingly submits to whatever disposition of it she may make. But although it be true that the soldier does not own his *time*, and when under orders must always be ready, it does not follow that any one is master of his body. His person is still, within the limits of discipline, all his own. And his duties of personal self-preservation never cease but with life. It is his duty to take as good care of his health as he can; to be cleanly, temperate, industrious, and moral, because he is the custodian of his country's flag and of her honor; and must vindicate, by the uprightness of his character, his claim to be considered worthy of defending her.

With a view of assisting him to preserve his health, by pointing out the principal sources of danger to which he is exposed, the following suggestions have been compiled.

EXERCISE.

After violent exercise, avoid lying or sitting immediately, and in the shade, or with the wind at your back. Let your coat remain buttoned, or if previously open, then button it. Keep in motion for a little while, and out of the sun, gradually cooling off, and finishing by washing face, neck, hands, and arms in cold water. All who have witnessed the dangerous

consequences that ever attend upon sudden checks of perspiration, whether through the instrumentality of air or the agency of cold water, will readily appreciate the language of the poet of health.

> "Hot from the field, indulge not yet your limbs
> In wish'd repose; nor court the fanning gale,
> Nor taste the spring. Oh! by the sacred tears
> Of widows, orphans, mothers, sisters, wives,
> Forbear. No other pestilence has driven
> Such myriads o'er the irremeable deep."

Drink not, then, while *hot* and wearied, on the march, from any stream, however tempting. Rinse your mouth, wash hands and face, but wait until you are cool before drinking, and then drink but little. In fact, the less water one drinks on a march through a strange country, the better. Change of water, more than any other single thing, induces derangements of the stomach and bowels, and to guard against it, every soldier should be furnished with a bottle of vinegar, a few drops of which will suffice to correct any brackishness or liminess of water.

But a far better thing is to fill the canteen before starting with half *coffee* and *water*,* *unsweetened*, which, when drunk cold on the march, is the best thirst-slaking and most refreshing beverage in the world. If coffee is not agreeable, tea answers just as well. Both these beverages are tonic, stimulant, and satisfying. Tea is more astringent than coffee, and

* The French troops depend entirely upon their *bidon* of *weak coffee* on the march, experience having convinced them that most waters are "flat, stale, and unprofitable," by the side of this.

for those disposed to looseness of bowels, is, on that account, preferable.

CLOTHING AND CLEANLINESS.

Without cleanliness of person no one can preserve good health. The skin being both a breathing as well as an eliminating organ, requires daily airing. It must be kept clean by friction as well as by frequent ablutions, but cleansing the skin avails little if the body-clothes are habitually soiled. For whatever is eliminated by the skin and absorbed by the clothing (being effete animal matter) is readily decomposed by the heat of the body, and becomes putrid. The necessity for changing the clothes and washing the body is therefore very apparent. It is a protection to health in the sense of being a purification of the body.

At least twice a week, in summer, the soldier, besides his daily morning ablutions of face, neck, hands, and feet, should wash his entire person. Soap should be used in the process. In winter, once a week may suffice.

He should never sleep at night in the flannel shirt, drawers, or socks worn during the day, but should exchange them for others of the same kind. If he is called in the night, he is just as ready with the shirt and drawers he has on, as he would have been with the others. At morning he should again resume the articles put off at night. By thus changing them morning and night, his body receives the benefit of an air-bath, and both his day and night garments

have an opportunity to be aired, which should be done by *hanging them in the sun*, so as to allow a circulation of air around them. These may appear trifling things, but they are nevertheless of great importance to comfort and to health, as all will find who once adopt them. A pinch of salt is also a trifling thing, and yet the comfort and the benefit of a whole meal may depend upon it.

Flannels worn in this way need not be changed oftener than once a week, while, when worn night and day uninterruptedly, they would become foul and offensive in half that time.

But socks, whether woollen or cotton, should be changed twice a week. The perspiration of the feet renders them otherwise intolerably offensive, inasmuch that the soldier's presence may become insufferable to his fellow-lodgers at night.

Avoid all sudden checks of perspiration. It is better to perspire than to shiver. So long as the skin is active and moist, there is little danger to health—

> "For while the effluence of the skin maintains
> Its native measure, the pluritic spring
> Glides harmless by; and Autumn, seek to death
> With sallow quartans, no contagion breathes."

When mounting guard at night in summer, it is better to wear an overcoat, even if compelled to keep it open, than to get chilled by going without it. A chill is the first stage of every kind of fever, and in southern latitudes is particularly to be dreaded.

Even if not so commanded by his superior officer,

the soldier should *always* wear flannel next the skin. But if it cannot possibly be endured, he should still wear a flannel *apron* over the stomach and abdomen, as a preventive to bowel complaints.

To protect himself against sunstroke, the Havelock cover to the cap should be worn, or, in the absence of this, a wet sponge, handkerchief, a few large leaves or grass, may be put in the cap. Abstinence from spirituous liquors will secure the soldier against predisposition to sunstroke, for it is found that the intemperate are usually the first victims.

No one should, on any account, lie in wet clothing. Blankets must be aired at morning, like every thing else that has been worn, and if *wet* should not be used.

When straw is used in tents for bedding, it must be daily turned, and when mouldy instantly thrown away.

Let there be kept up a good circulation of air throughout the night in the tent, by leaving the doorway open. If the rain come in on that side, shut it, and raise a part of the tent on the opposite side. But never sleep without some ventilating orifice. Good air is more essential than good food. A human being consumes about 18 pints of it per minute, or nearly two hogsheads and a half per hour; and air once *ex*pired is no longer fit to be *re*spired.

A small trench dug around the tent makes a good conduit for the rain, and prevents it from spreading over the surface of the ground; and the dryer the ground is in and about the tent, the better for the

comfort and health of its occupants. For this purpose all grass should be plucked out as closely as possible, and not suffered to decay, as it will from the heat of bodies lying on it. As elsewhere said, the proper flooring for a tent is an India-rubber blanket. If the government does not furnish one, and the soldier can afford it, he should provide one for himself.

DIET AND DIGESTION.

Although the soldier's dietary is fixed by law, neither his appetite nor his digestion regulate themselves by it. They ever retain their own character, and suffer or flourish according to the degree of compatibility existing between them and his food. It is true that all men need good food and well cooked, but all men do not need the same quantity, nor to be fed the same number of times. Hence, rules of quantity and hours of eating are made to suit the average of mankind; and, within these rules, every individual must, by a proper study of his own temperament and wants, guide the daily conduct of his body.

As a general rule, sameness of diet, when long continued, weakens digestion in all men. Therefore let there be some variation daily, even if it only consists in omitting part or the whole of any article. The stomach will relish it all the better when it is again resumed. Thus, soup may be omitted at one dinner, and beef at another, and the beef may be eaten at evening, or, better still, the next morning, in lieu of a ration of pork. Always save any surplus

beef and bread in your haversack against a time of need. It is more nourishing, more strengthening, and less cloying than pork, and when this latter happens to be the ration and you have no relish for it, the bread and beef will serve you a good turn. Never be afraid of good beef—it is the best foundation on which to build good health.

Avoid *fat* pork as much as possible in summer and in warm latitudes. It disposes to bowel complaints, and should never be made a staple article in any dietary. It should only be used to flavor other articles, or to fry with. Lean salt pork (hams, sides, or shoulders) is not open to the same objection.

Beans, unless thoroughly cooked, are only fit for horses. When half cooked they will provoke indigestion and diarrhœa in almost any one. The best preventive against them in such a state is to *let them alone*. All the vinegar and pepper you can put on, will not render them digestible. When sound and well cooked, however, they make an excellent *side* dish; but an entire meal should never be made of them. They should be subordinated to meat, bread, and potatoes. A little vinegar assists their solution, and pepper corrects their tendency to produce flatulence.

Eat your bread stale. It is lighter and more digestible; you will need less to satisfy you, and it will incommode you less, whatever the quantity eaten. Brown bread contains more nourishment than white, and is, besides, slightly laxative. Some of the strongest men in the world are fed on brown bread.

With rice, fat of some kind should be used as a flavorer. All mucilaginous articles of food—veal, pork, beans, and peas—should have a little vinegar added to them as a dressing, also pepper. In summer, vegetable acids, like vinegar or sorrel, are beneficial in small quantities.

Besides meat, vegetables are necessary to health. Any succulent roots, such as are put in soup, should be partaken of, but always as *side* dishes, and never as staples. Thus with beef, carrots or parsnips, either stewed or boiled, should be partaken of. Onions are also beneficial, and should be eaten. They are stimulating and somewhat medicinal.

Dried apples and peaches, when stewed, are desirable articles, and serve a good purpose in the system: being slightly laxative as well as refreshing. They should be flavored with a little ginger or clove, and kept as a valuable store to be used occasionally.

Ardent spirits are not necessary to health in the healthy. All authorities agree that their use is pernicious in warm latitudes, and the soldier is everywhere found to be better without them. Their place, properly speaking, is among hospital stores. There they should remain, and be dispensed only under the advice of medical officers. Abstinence from the use of spirits, when in the South, will be found a great preventive against diseases of the stomach and bowels.

PASSES.

The privilege of a pass is too often a privilege to the grave. The errors in diet, and the irregularities

in bodily conduct, committed by soldiers when allowed to roam through a town, are so common, and so speedily visited by physical penalties, as to plainly indicate that this privilege is a dangerous favor to grant. It rarely happens that the hospitals do not attest, on the morrow, the consequences of this much sought-for dispensation. Lounging all day from shop to shop, eating sweets here, drinking spirits and acids there, gorging themselves with all manner of incompatible edibles, and drinking too often of spirits to excess, together with exposure to sun and dew; these are the parent causes of the mischief which so often attends upon "passes." Were men but to reflect a moment upon the line of conduct they so frequently pursue on these occasions, common sense would warn them of the accidents to health which they thus voluntarily court. It is in the excesses committed both in eating and drinking that lies the mischief. For, would soldiers only behave themselves out of the camp as in it; were they to eat at the same hours, and in no greater quantity, at the town table than at the mess table; would they avoid promiscuous drinking, and take spirits if they *will*, only with their holiday dinner—they would not find themselves groaning the next day under the doctor's care. Temperance in all things, imprudence in none, should be their rule and shield.

INDIGESTION.

Whenever an attack of indigestion is experienced, accompanied by nausea, make no attempt to check

this latter with brandy or any other stimulant, until you have first aided the stomach in throwing off its offending contents; when this has been fully done by vomiting, then, and not till then, are stimulants allowable. Abstinence, rest, sleep, and small draughts of cold water, are better sedatives to an irritated stomach than either brandy or whiskey.

If diarrhœa * supervene, take no spirituous liquors to check it. Let the bowels first rid themselves of any offending matter; after which rest, extra warmth on the surface, so as to induce perspiration—an almost total abstinence from liquids, especially coffee, avoiding fat meat, beans, &c., will generally produce relief—within twenty-four hours. If pain and discharges still continue, report yourself on the sick list.

Constipation is never to be so much dreaded as diarrhœa, because it is always more or less under our control.† Diminishing the quantity of salt meat daily consumed, and increasing that of vegetables; avoiding an over use of pepper, drinking a tumbler of cold water fasting in the morning, soliciting nature at regular hours, and not omitting to attend to her calls when made; an observance of all these particu-

* Wherever there is an habitual disposition to looseness of bowels, much benefit is often derived from a simple abstinence from *liquids*. A *dry, unirritating diet*, has been known to produce an entire change of this condition and habit of the bowels.

† Neglected constipation is very apt to induce *piles*. In such cases, the best treatment is the application of a soft rag, wetted in cold water, to the fundament, immediately after an evacuation. Wash the parts, carefully push back any protruding pile, and on going to bed, lay the wet rag on, and keep it there all night.

lars will most generally afford relief. But if much headache accompany either constipation or diarrhœa, the proper course is to report yourself at once to the surgeon.

Taking cold, as it is commonly designated, is usually the result of unequal exposure of different portions of the body to the action of a low temperature. A man in a state of perspiration takes off his hat and fans himself, or remains in a current of air bareheaded, or removes his cravat; in a short time he discovers himself to be hoarse; he sneezes and gives other indications of a cold in the head. Another, under similar circumstances, exposes a larger surface of his person, and gets a more extensive cold. In either case, a state of partial congestion of the lining membrane of nose, throat, and possibly lungs, has happened. The capillary circulation, while in a state of great activity, has become suddenly arrested by the constricting effects of a low temperature upon the walls of its blood-vessels. What is the consequence? First, a slight chill; secondly, fever. Now, the remedy is a plain one, and consists in re-establishing the activity of the skin. First of all things, let the patient perspire, and the sooner he does so, the shorter will be the duration of the disorder. After the cold has "settled," it will be beyond his reach, and the surgeon will then need to interpose his skill. But until that time a man may, by early dieting, total abstinence from liquids of any kind for a day or two, and dressing warmly, recover himself without medication. It only requires immediate

action, and perseverance in carrying out its details, to insure success. Napoleon used to treat his colds by fasting all day, and riding on horseback; two most excellent means for stimulating the circulation, and keeping up a constant moisture of the skin.

When the feet become tender from excessive perspiration—to prevent which, care should be had on a march to wash them night and morning in cold water,—bathing with spirits will harden and relieve them. This is usually done by pouring spirits into the boots when on. But a better and a cheaper remedy is good beef *suet*, which, when applied freely, checks inordinate perspiration, keeps them soft, and prevents cracks and chafings. Beef suet should always be included among a soldier's stores.

A veil, and a small bottle of camphorated oil for anointing exposed parts, will answer a good purpose to the soldier in southern latitudes, by protecting him at night from musquitoes, and those other innumerable insects that "mostly do congregate" there.

TREATMENT OF WOUNDS BEFORE THE ARRIVAL OF THE SURGEON.

As more or less time must always elapse between the reception of a wound, and the attendance of a surgeon, it will be well for every one to understand in what way temporary relief can always be afforded to the suffering.

Every soldier should carry about his person a large, stout handkerchief. This will, in an emergency, answer as a tourniquet, a bandage, or a sling

for a wounded arm. A tourniquet is a strap made from any kind of material, and twisted tightly about a limb to check bleeding. A handkerchief, or a piece of rope, is the readiest thing out of which to improvise a *field-tourniquet*. In order to apply it, place the strap around the limb loosely, and tie it in a hard knot. Now bring the knot (which, if possible, should have a little pad of cloth under it) directly over the wound; thrust a stick between the strap and the limb on the side opposite to the wound, and twist it around and around until the bleeding stops, and then confine it.

Where the cut is large and gaping, first observe whether the bleeding is continuous or by intermittent jets; if the former, then *veins* alone are wounded, and the tourniquet should be applied *below* the wound, but as near its edge as possible. Where, on the contrary, the bleeding is by intermittent jets, then an artery is wounded, and the tourniquet should be applied *above* the wound; that is to say, *between* it and the heart. Never pour spirits of any kind upon a bleeding wound. It does no good, and only serves to irritate and to inflame it. Wash out all dirt from it with pure cold water, bring the edges as near together as you can, and apply the tourniquet as above directed.

Whenever any one has fainted from loss of blood, do not raise him up *suddenly* on any account. Raise his head slightly and slowly, if desirous to give him a restorative; but never raise his chest until he has fairly "come to," and breathes deeply. Before try-

ing to restore him, it is wise first to check his bleeding, as during faintness the blood almost ceases flowing, and wounds can then be more easily attended to. In transporting him to the ambulance, and while in it, keep him horizontal, and free from sudden motion.

A wounded man is always thirsty, and then he needs, not spirits, but cold water; give him his choice in this particular, and you will see that *water, water*, is the unfailing request.

Whenever any penetrating wound of the chest is unaccompanied by external bleeding, and yet blood is coughed up, and suffocation seems at hand, keep the chest erect, fan the patient, cover the wound closely with a pad wet in cold water, and give him small sips of *spirit* and water.

Whenever joints are wounded, keep them in position, and free from motion, by wrapping a wet bandage tightly about them; and if any small, flat pieces of wood can be found, use them as *splints*, placing one on either side of the joint, and tightly bandaging it. In this way much pain may be avoided from muscular contraction, and even lockjaw be averted.

In all large wounds of the abdomen, particularly those involving protrusion of the bowels, keep the person lying down. Cover the wound, and place a bandage around the body to prevent motion of the bowels.

In wounds of the head, cold applications are always beneficial. Put on a wet pad, and a tight bandage over it.

Let the wounded always be handled carefully and tenderly, avoiding all suddenness of motion in transporting them, and making every provision for their comfort.

THE THROAT AND VOICE IN OFFICERS.

Officers, from a protracted use of the voice in an unnatural key and in a dusty atmosphere, are often troubled with irritation of the throat, which threatens serious damage to the voice. I have no doubt, also, that *smoking* induces a change in the follicles of the mucous membrane, whereby its secretions are greatly altered, and a pre-disposition to *roughness* and huskiness of voice is engendered. That pre-disposition can be eradicated only with the habit creating it. But during its prevalence, any extra effort to clear the voice, and to push it beyond its natural key will only result in producing chronic irritations of the throat. To avoid this, the voice should never be strained. By gradual efforts in the open air it can be greatly increased in volume. Should irritation, however, manifest itself, it will be well to frequently gargle the throat with cold water; or, if that be not sufficient, the addition of a few grains of tannin will impart an astringent character to it, generally desirable in relaxed states of those parts. A good preparation for those who are habitually troubled with irritation of the throat is, a solution of tannin in glycerine (two scruples to an ounce.) By painting the throat with this, which is neither irritating nor corrosive, great relief will often be obtained.

CHAPTER X.

ON HOSPITALS.

Hospitals are among the indispensable necessities of an army. Without them no force could be maintained in the field; for the gallant men who flock beneath the standard of their country would be demoralized, and dispersed after the first battle, by witnessing the unrelieved sufferings and the merciless sacrifice of their fellow-soldiers. If it be true, as Homer has sung, that

> "A good physician, skilled our wounds to heal,
> Is more than armies to the public weal,"

it is equally true that in an army the "good physician" is powerless to treat wounds and diseases without a hospital in which to place his patients.

But observation has shown that while hospitals are ever instituted to alleviate suffering and to promote good, they have, in too many instances, failed to accomplish either object, and on the contrary been instrumental in doing much harm. The bitter ex-

perience of Sir John Pringle in the campaigns of the British army during the last part of the eighteenth century led him to say that "hospitals are among the chief causes of mortality in armies." This truth has had, unfortunately, to be recognized even in our own day, but with this difference that we not only know whence comes this fearful mortality of hospitals, but have practically demonstrated the fact that it can be diminished by over *one-half*. In the general hospital at Scutari during the first part of the Crimean war, and which was very much over-crowded, *two* out of every *five* patients died, the mortality averaging about 42.7 per cent. on the admissions. In the *hospital-tents*, on the contrary, the mortality was only about half that, showing conclusively the advantage to be in favor of small-rooms, and fewer patients.

One of the principal causes of insalubrity in all hospitals is evidently the deterioration of the air due to the assembling of a large number of sick in any one apartment. In former days it was the fashion to have large wards, which, good enough in themselves, were yet entirely robbed of their advantages by over-crowding them with patients. Thus a writer, speaking of the Hotel Dieu, at Paris, in 1778, says, that in some wards there were from 500 to 800 patients, and in each of the large beds (52 inches wide) from 4 to 6 occupants! There was no classification of diseases either, but all were promiscuously commingled! It is needless to say that epidemics constantly raged in those wards, or that the mortality was exceedingly high. No amount of ventilation, in fact, short of

tearing down the walls, could have relieved them of their pestiferous atmosphere.

The first and great requisite of all hospitals is a constant supply of pure, fresh air, brought directly into each ward, without passing through any room, corridor, or passage-way.

The sick require a more rapid change of air than the well. Their emanations, always more or less offensive, serve, when commingled in the atmosphere of a ward, greatly to depress the vital energies of each other; and thus a common retardation of recovery ensues, even if nothing worse happens. The offensiveness of the dejections in certain diseases, and of all discharging wounds in general, requires that military hospitals should beyond all others be well ventilated. And, indeed, unless this be done they are worse than useless, because they become simply foci of purulent infection to all their inmates. It would be far better to treat a wounded man out of doors, and with nothing but a blanket over him for a tent, than to subject him to an atmosphere which is very sure to develop gangrene. Besides *over-crowding*, which, as we have elsewhere seen, is so fruitful a source of increased mortality in hospitals, the external air may from various causes be vitiated, so as to produce analogous results. The position of the building with reference to sewers, marshes, stagnant streams, and the course of prevailing winds; or carelessness in the administration of its out-buildings, sinks, wash and cook houses, will all play an important part in determining the health and chances of recovery of its

inmates. Miss Nightingale relates that in the hospital at Scutari the mortality rose

From	17.9 in Dec.
To	32.1 in Jan.
And	42.7 in Feb.

although the wards were not over-crowded, but *dead dogs* and *horses* had been lying for some time in its yard! At the Massachusetts General Hospital last year, gangrene developed itself immediately upon the opening of the mouth of a sewer in its vicinity. The disease had never been previously known there. In all hospitals situated in the populous parts of cities, the treatment of certain surgical diseases, is attended with much more uncertainty, and the percentage of recoveries is much smaller, than in suburban or rural hospitals. These facts show conclusively the immense influence which *locality* alone exercises upon the value of a hospital; for, unlike other and merely architectural defects, this one is irremediable.

The opinion is daily gaining ground that small *pavilion-hospitals* are better than large buildings with many stories. The number of human beings who can with safety inhabit a given area of ground is limited, and although stories upon stories may be built and tenanted, yet the law of nature is not thereby changed. As long ago as Hunter's day it was observed that the mortality in the *upper* wards, all other things being equal exceeded that of the lower ones; and the inference was thence drawn that there may be over-

crowding as well by piling wards over each other, as by overfilling any one ward. In recently constructed European hospitals they have acted upon this suggestion by extending their area, and diminishing their altitude. This lightens the duties of the service very much, by bringing so many various rooms upon the same floor. Convalescents also can move about more easily, and having no high stair-cases either to descend or to climb, do not require so much personal attendance. In the cases of crippled men it becomes of great advantage, in allowing them to take short walks outside of the wards proper, to sun and air themselves in the grounds, and to be near their own quarters in case of faintness, or weariness.

Next to good locality, hospitals need abundance of *sunlight* in all their wards; and it is unnecessary to explain why, because of the universal knowledge of the benefits accruing to mind and body from the daily and direct influences of sunshine. Wards must be so constructed that the sun may be able to shine in them during some portion of the day.

Deficiency of space, for the numbers contained and the successful performance of the various hospital services, is another evil to be guarded against. While overcrowding relates more particularly to the condition of wards, deficiency of space includes the commingling in proximity of duties which, by reason of the noises produced by them, or the smells evolved, should be kept at a distance from the sick. Thus, the kitchen, the wash-rooms, and store-rooms should not be in contiguity to the wards. The smells of the

one, and the noises of the other, would both disturb and distress patients. In the wards, beds should be at least *three* feet apart, so as to admit of a small stand or table between them.

Ventilation is, after all, the great desideratum in all hospitals. Plenty of air and a constant renewal of it, is what the sick must have. The size of the wards should be so regulated as to secure to each patient from 1,000 to 1,500 cubic feet of air, with ventilation adequate to supplying him with 60 cubic feet of fresh air per hour. This air, as before said, should come directly into the ward, and without first passing through any corridors, rooms, or passage-ways. Every such channel of ingress is more or less contaminating and therefore objectionable.

Beds.—The best beds for hospitals are *hair-mattrasses*, which are always smooth, soft, and springy. Straw is cold and hard, and wholly unfit for the sick to lie on. It is not advisable to place beds against dead walls, as more or less moisture is always emitted by them. The current of air flowing along their sides is cooler, denser, and therefore objectionable as a local atmosphere for the sick. Nor should beds be placed directly opposite to windows. Of these last there should be enough to have one window between every two beds.

Walls.—The walls of hospitals should be made of materials that are not absorbent; hard finish painted with some neutral tint is best. But in hospitals hastily constructed and intended only to be temporary, such precautions cannot always be taken.

They are often shanties or huts, hastily put up with boards and unsusceptible of more perfect finish. But even in such cases protection may be obtained by thoroughly washing them over, walls and ceiling, with some neutral tint. *White*-wash is too glaring to the eyes, and a mellower tint is better. The process should be occasionally repeated, taking advantage of an opportunity when the sick can be removed to another ward. It should never be done while they are in it.

Ceilings should be high, the higher the better; but never less than 12 feet. The bedsteads of iron; the furniture of hard wood, and the utensils of glass and earthen.

One nurse to every ten bedsteads, and one surgeon with two assistants to every fifty patients, seems about as little as will suffice.

The best size for wards on the score of cleanliness, ventilation, and facility of service is that containing about 20 beds.

List of Hospital and Field Supplies for the Sick and Wounded, as Recommended by the N. Y. Medical Relief Association.

1. Bandages.—Assortment and proportionate numbers of each variety required:—

1	dozen,	1	inch	wide,	1	yard	long.
2	dozen,	2	inches	wide,	3	yards	long.
2	"	2½	"	"	3	"	"
1	"	3	"	"	4	"	"
½	"	3½	"	"	5	"	"
½	"	4	"	"	6	"	"

2. Lint—Scraped and ravelled, in equal proportions.

3. Old linen and cotton cloth, without selvedge or seams, for compresses.

4. Ring pads and cushions.

5. Cotton batting and cotton wadding; fine flax and sponges.

6. Red flannel in the piece.

7. Bookbinders' boards for splints; pieces 18 by 4 inches.

8. Saddlers' silk for ligatures; wax, pins, and small pin-cushions.

9. Sewing needles, assorted in cases; linen thread, tape, and scissors.

10. Adhesive plaster, camel-hair pencils, oiled silk, oiled muslin, india-rubber and gutta percha cloths, in the piece.

11. Wrapping-paper.

12. Cotton shirts, drawers, and slippers.

13. Sheets, 4 feet wide and 6 feet long.

14. Bed-sacks, 3 feet wide and 6 feet long.

15. Pillow-sacks and towels.

16. Hospital knapsacks.

17. Field stretchers.

18. Eye-shades of green silk.

19. Lanterns.

20. Bed pans and urinals, metallic ones preferred.

21. Dressed sheep-skins.

FIELD HOSPITALS.

Field hospitals or *ambulances* are a part of the necessary equipment of armies. They are of two kinds, either *stationary* or *flying*. The permanent or stationary ambulance is located at some distance from the field of battle and out of harm's way; while the flying ambulance follows the regiment into battle, and affords provisional succor to the wounded until they can be transported to the stationary hospital.

As army regulations prescribe the details of arrangement for this class of hospitals, little need be said on the subject. Their temporary character, too, removes them from the necessity of those hygienic observances so indispensable in the construction of permanent hospitals.

The propriety of localizing the stationary ambulance near a stream of water, and of designating its location by a flag which can be plainly seen, will readily occur to every surgeon. What is chiefly wanted also, is a sufficient corps of *hospital-dressers*, to relieve the surgeon from all duty but that of operating.

In most of our volunteer regiments there is plainly an inadequacy of medical assistance. One surgeon and mate are not enough to perform successfully the ambulance service of a whole regiment. More *assistants* are needed, otherwise you will cripple the surgeon in times of pressing want by taking away his mate to attend the flying ambulance. This certainly

is jeopardizing the lives of the wounded in a most reprehensible manner. "Considering how many young medical men there are who thirst for an opportunity as well to serve their country and humanity, as to perfect themselves in surgical knowledge, we cannot feel that the state could do our brave volunteers a more signal service than to enlarge the medical staff of our various regiments to an extent commensurate with what, it strikes us, must eventually become among the most prominent necessities of the medical service in our army. All will agree, at least, in the fact that the medical assistance hitherto provided to meet the exigencies of the terrible conflict that is impending, is not adequate to the probable necessities of the army, and that in no respect could greater service be rendered our regiments than by the organization and instruction of a sufficient number of good ambulance corps." *

* "*War and Medicine*," an article by the author, in the *American Medical Times* of May 4, 1861.

APPENDIX.

UNITED STATES ARMY REGULATIONS RELATING TO AMBULANCES AND HOSPITAL SUPPLIES.

THE following are the decisions and recommendations contained in the Report of the Army Medical Board, (Jan. 19, 1860,) constituted by War Department Special Orders No. 195, current series, "to examine, select, and report such models" of ambulances "as it may think most suitable" for the Army; and to "examine the present standard supply table with reference to field service." They are published for the information of the Army:

1. That ambulance transportation ought to be furnished for 40 men per 1,000; 20 lying extended and 20 sitting.

2. That both two and four-wheeled ambulances are necessary for the hospital service.

3. That a two-wheeled ambulance is the best for the conveyance of dangerously sick or dangerously wounded men.

4. The Board being of opinion that both of the two-wheeled ambulances submitted to its inspection by Surgeon C. A. Finley and Assistant Surgeon R. H. Coolidge are well adapted to the purposes for which they were designed, and that their relative merits can only be determined by experiment, adopt both, and recommend that one of each pattern be sent to the respective Military Departments of Texas, New Mexico, Utah, California and Oregon, and two of each pattern to Fort Leavenworth, and that they be placed in service at the scenes of Indian hostilities, and on marches across the plains, in order that their practical advantages may be ascertained.

5. As the pattern of a four-wheeled ambulance designed by Surgeon Tripler, in the opinion of the Board, meets more fully the requirements of the service for the transportation of the slightly wounded, the slightly sick and convalescent, than any other pattern that has been submitted, the Board decide to adopt it, and recommend that three be constructed, and that one be sent to the Department of Texas, one to the Department of New Mexico, and one to Fort Leavenworth in the Department of the West, for trial in active service.

6. That of the two patterns of mattress frames presented for examination by Assistant Surgeon Coolidge, the one without the box be adopted for trial.

The service of Surgeon McDougall as a member of this Board being confined "to the consideration of the subject of a pattern ambulance only," and that duty having been performed, Surgeon McDougall was relieved, and returned to his post.

The Board, as originally constituted, then proceeded to the consideration of the amount and kind of transportation required for the sick and wounded and for hospital supplies; the allowance of hospital stewards,

cooks, and nurses; and also the nature and extent of tent accommodation, for troops on marches and in campaigns against Indians, and for a state of war with a civilized enemy.

The following are the decisions and recommendations of the Board:

1st. The Board recommend that the following amount and kind of transportation for the sick and wounded be provided for troops on marches and in campaigns against Indians:

For commands of less than five companies, to each company, one two-wheeled ambulance.

For a battalion, of five companies, one four-wheeled and five two-wheeled ambulances.

For a regiment, two four-wheeled and ten two-wheeled ambulances.

2d. The Board, anxious to provide for the necessities and to secure the comfort of the sick and wounded soldiers to the fullest extent under all circumstances, recommend that the following schedule of transports for the sick and wounded and for hospital supplies, be adopted for a state of war with a civilized enemy:

For commands of less than three companies, one two-wheeled transport cart for hospital supplies, and to each company one two-wheeled ambulance.

For commands of more than three and less than five companies, two two-wheeled transport carts, and to each company one two-wheeled ambulance.

For a battalion of five companies, one four-wheeled ambulance, five two-wheeled ambulances, and two two-wheeled transport carts. For each additional company less than ten, one two-wheeled transport cart.

For a regiment, two four-wheeled ambulances, ten two-wheeled ambulances, and four two-wheeled transport carts.

And that the transport carts be made after the models of the two-wheeled ambulances, (their interior arrangement for the sick excepted,) and to have solid board flooring to the body.

The Board also resolved: That horse-litters be prepared and furnished to posts whence they may be required for service on ground not admitting the employment of two-wheeled carriages; said litters to be composed of a canvas bed similar to the present stretcher, and of two poles each sixteen feet long, to be made in sections, with head and foot pieces constructed to act as stretchers to keep the poles apart.

3d. The Board also recommend that the allowance of hospital attendants for a regiment in the field be, for one company, one steward, one nurse, and one cook; for each additional company, one nurse; and for commands of over five companies, one additional cook.

4th. The great size and weight of the present hospital tent render it objectionable in view of its transportation, and make it difficult and ofttimes impossible to pitch it on prairies and in high winds. The Board does therefore recommend that in future hospital tents be made according to the pattern of the present tent, and of the same material, but smaller, and having on one end a lapel so as to admit of two or more tents being joined and thrown into one with a continuous covering or roof.

The dimensions to be these: In length, 14 feet; in width, 15 feet; in height, (centre,) 11 feet, with a wall 4½ feet, and a "fly" of appropriate size. The ridge pole to be made in two sections after the present pattern; and to measure 14 feet when joined.

The Board contemplate that such a tent will accommodate from 8 to 10 patients comfortably.

The Board recommend the following allowance of tents for the sick, their attendants and hospital supplies:

Companies	Hospital tents.	Store tents.	Common tents.
For one company.....	..	1	1
For three companies.....	1	1	1
For five companies.....	2	1	1
For seven companies.....	2		1
For ten companies.....	3	1	1

The Board also recommends the adoption of a hospital knapsack, to be carried by a hospital orderly upon the march or in battle, who is habitually to follow the medical officer. The knapsack to be made of light wood; to be divided into four compartments or drawers, and to be covered with canvas after Colonel Buchanan's model knapsack, if that be adopted in the army. The purpose of this apparatus is to carry in an accessible shape such instruments, dressings, and medicines, as may be needed in an emergency on the march or in the field. The dimensions of the hospital knapsack to be those of the ordinary knapsack.

The Board respectfully request that one of each of the ambulances recommended for trial, be made under the immediate supervision of the officer by whom it was designed.

WASHINGTON, D. C.,
November 2, 1859.

STANDARD SUPPLY TABLE FOR GENERAL AND POST HOSPITALS.

Articles.	Quantities for one year for commands of—					Memoranda.
	From 100 to 200.	From 200 to 300.	From 300 to 400.	500 men.	1,000 men.	
MEDICINES.						
Acaciæ.....lb.	2	4	6	8	16	
Acidi acetici.....lb.	½	1	2	2½	5	
" arseniosi.....oz.	½	1	2	2½	5	
" benzoici.....oz.	1	2	3	4	8	
" citrici.....lb.	1	2	3	4	8	
" muriatici.....lb.	½	1	2	2½	5	
" nitrici.....lb.	1	2	3	4	8	
" sulphurici.....lb.	1	2	3	4	8	
" " aromatici.....lb.	1	2	3	4	8	
" tannici.....oz.	2	4	6	8	16	
" tartarici.....lb.	2	4	6	8	16	
Aetheris sulphurici loti.....lb.	2	4	6	8	16	
Alcoholis.....comg.	5	10	15	20	40	
Aloës.....oz.	4	8	12	16	32	
Aluminis.....lb.	1	2	3	4	8	
Ammoniaci.....lb.	½	1	2	2½	5	
Ammoniæ carbonatis.....oz.	8	16	24	32	64	
" muriatis.....lb.	½	1	2	2½	5	

Anthemidis	lb.	1	2	3	4	8	
Antimonii et potass. tartratis	oz.	3	6	9	12	24	
Argenti nitratis (crystals)	oz.	1	2	3	4	8	
" " (fused)	oz.	1	2	3	4	8	
Arnicæ	lb.	1	2	3	4	8	
Assafœtidæ	oz.	4	8	12	16	32	
Bismuthi subnitratis	oz.	4	8	12	16	32	
Camphoræ	lb.	2	4	6	8	16	
Cardamomi	oz.	8	16	24	32	64	
Catechu	lb.	½	1	2	2½	5	
Ceræ albæ	lb.	2	4	6	8	16	To be issued to posts where simple cerate cannot be sent without becoming rancid.
Cerati resinæ	lb.	2	4	6	8	16	
" simplicis	lb.	8	16	24	32	64	
" zinci carbonatis	lb.	2	4	6	8	16	
Chloroformi	lb.	1	2	3	4	8	
Collodii	oz.	2	4	6	8	16	
Copaibæ	lb.	5	10	15	20	40	
Creasoti	oz.	2	4	6	8	16	
Cretæ preparatæ	lb.	1	2	3	4	8	
Cupri sulphatis	oz.	2	4	6	8	16	
Emplastri adhæsivi	yds.	5	10	15	20	40	
" cantharidis	lb.	3	6	9	12	24	
" ferri	lb.	1	2	3	4	8	
" hydrargyri	lb.	½	1	2	2½	5	
" ichthyocollæ	yds.	3	6	9	12	24	
Extracti belladonnæ	oz.	2	4	6	8	16	
" buchu fluidi	lb.	1	2	3	4	8	
" colchici acetici	oz.	1	2	3	4	8	

TABLE FOR GENERAL AND POST HOSPITALS—Continued.

Articles.	Quantities for one year for commands of—					Memoranda.
	From 100 to 200.	From 200 to 300.	From 300 to 400.	500 men.	1,000 men.	
Extracti colocynthidis comp.....oz.	8	16	24	32	64	
" columbæ fluidi.....lb.	1	2	3	4	8	
" conii.....oz.	1	2	3	4	8	
" cubebæ fluidi.....lb.	1	2	3	4	8	
" gentianæ fluidi.....lb.	1	2	3	4	8	
" glycyrrhizæ.....lb.	6	12	18	24	48	
" hyoscyami .....oz.	2	4	6	8	16	
" ipecacuanhæ fluidi.....lb.	½	1	2	2½	5	
" piperis fluidi.....oz.	1	2	3	4	8	
" pruni virg. fluidi .....lb.	1	2	3	4	8	
" rhei fluidi.....lb.	1	2	3	4	8	
" sarsaparillæ fluidi.....lb.	2	4	6	8	16	
" senegæ fluidi.....lb.	½	1	2	2½	5	
" sennæ fluidi.....lb.	1	2	3	4	8	
" taraxaci fluidi.....lb.	1	2	3	4	8	
" valerianæ fluidi.....oz.	8	16	24	32	64	
" zingiberis fluidi.....lb.	½	1	2	2½	5	
Ferri iodidi .....oz.	2	4	6	8	16	
" et quiniæ citratis.....oz.	4	8	12	16	32	
" sulphatis .....oz.	2	4	6	8	16	

Gambogiæ ....oz.	[illegible]	1	2	[illegible]	[illegible]
Guaiaci resinæ.......................lb.	[illegible]	1	2	[illegible]	[illegible]
Hydrargyri chloridi corr.............oz.	[illegible]	1	2	[illegible]	[illegible]
" " mitis.............lb.	1	2	[illegible]	4	8
" cum creta.............lb.	[illegible]	1	2	[illegible]	[illegible]
" iodidi.............oz.	1	2	3	4	[illegible]
" oxidi rubri.............oz.	1	2	[illegible]	4	[illegible]
Iodinii.......................oz.	2	4	[illegible]	[illegible]	1[illegible]
Lini.......................lb.	4	[illegible]	1[illegible]	1[illegible]	[illegible]
Liquoris ammoniæ.............lb.	4	[illegible]	1[illegible]	1[illegible]	[illegible]
" ferri iodidi.............lb.	1	2	[illegible]	4	8
" potass. arsenitis.............oz.	[illegible]	4	[illegible]	[illegible]	1[illegible]
" sodæ chlorinatæ.............bott.	[illegible]	[illegible]	9	1[illegible]	24
" zinci chloridi.............bott.	[illegible]	6	[illegible]	1[illegible]	24
Magnesiæ.......................lb.	[illegible]	1	2	[illegible]	[illegible]
" sulphatis.............lb.	2[illegible]	[illegible]	7[illegible]	1[illegible]	[illegible]
Massæ pil. hydrargyri.............oz.	[illegible]	1[illegible]	24	[illegible]	64
Mellis despumati.............lb.	2	4	[illegible]	[illegible]	1[illegible]
Morphiæ sulphatis.............dr.	[illegible]	4	[illegible]	[illegible]	1[illegible]
Myrrhæ.......................lb.	[illegible]	1	[illegible]	[illegible]	[illegible]
Olei anisi.......................oz.	1	[illegible]	[illegible]	4	[illegible]
" cajuputi.............oz.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
" caryophilli.............oz.	1	2	3	4	[illegible]
" cinnamomi.............oz.	[illegible]	2	[illegible]	4	8
" menthæ piperitæ.............oz.	[illegible]	4	[illegible]	8	16
" morrhuæ.............bott.	[illegible]	1[illegible]	24	[illegible]	64
" olivæ.............bott.	[illegible]	1[illegible]	24	[illegible]	64
" origani.............oz.	4	[illegible]	[illegible]	1[illegible]	[illegible]
" ricini.............qt. bott.	1[illegible]	[illegible]	[illegible]	4[illegible]	[illegible]
" terebinthinæ.............qt. bott.	[illegible]	[illegible]	1[illegible]	16	[illegible]

TABLE FOR GENERAL AND POST HOSPITALS—Continued.

Articles.	Quantities for one year for commands of—					Memoranda.
	From 100 to 200.	From 200 to 300.	From 300 to 400.	500 men.	1,000 men.	
Olei tiglii.....dr.	2	4	6	8	16	
Opii.....lb.	½	1	2	2½	5	
Picis abietis.....lb.	1	2	3	4	8	
Plumbi acetatis.....lb.	1	2	3	4	8	
Potassæ acetatis.....lb.	1	2	3	4	8	
" bicarbonatis.....lb.	1	2	3	4	8	
" bitartratis.....lb.	2	4	6	8	16	
" chloratis.....lb.	1	2	3	4	8	
" nitratis.....lb.	1	2	3	4	8	
" sulphatis.....lb.	½	1	2	2½	5	
Potasii cyanureti.....dr.	1	2	3	4	8	
" iodidi.....oz.	8	16	24	32	64	
Pruni virginianæ.....lb.	½	1	2	2½	5	
Pulveris acaciæ.....lb.	2	4	6	8	16	
" capsici.....lb.	1	2	3	4	8	
" cinchonæ.....lb.	1	2	3	4	8	
" ferri.....oz.	2	4	6	8	16	
" " per sulphatis.....oz.	1	2	3	4	8	
" glycyrrhizæ.....oz.	4	8	12	16	32	
" ipecacuanhæ.....lb.	½	1	2	2½	5	

Pulveris ipecacuanhæ et opii .... lb	1/2	1	2	2 1/2	[illegible]
" jalapæ .... oz.	4	[illegible]	12	16	[illegible]
" lini .... lb	8	16	24	[illegible]	64
" opii .... lb	1/2	1	2	2 1/2	5
" rhei .... oz	4	8	12	[illegible]	[illegible]
" sabinæ .... oz.	1	2	[illegible]	4	[illegible]
" sinapis nigræ .... lb	6	12	18	24	48
" ulmi .... lb.	2	4	6	[illegible]	16
Quassiæ .... lb.	1/2	1	[illegible]	2 1/2	5
Quiniæ sulphatis .... oz	10-20	20-40	[illegible]	40-[illegible]	80-160
Rhei .... oz	4	[illegible]	12	16	[illegible]
Sacchari .... lb.	20	40	[illegible]	80	[illegible]
Saponis .... lb.	4	8	12	[illegible]	[illegible]
Scillæ .... oz	4	8	12	16	32
Serpentariæ .... lb.	1/2	1	2	2 1/2	5
Sodæ bicarbonatis .... lb.	2	4	6	8	16
" boratis .... lb.	1/2	1	2	[illegible]	5
" et potassæ. tartratis .... lb	3	6	9	[illegible]	24
Spigeliæ .... lb.	1/2	1	2	[illegible]	5
Spiritus ammon. aromatici .... oz.	2	4	6	8	16
Spiritus ætheris compositi .... lb.	1/2	1	2	[illegible]	5
" " nitrici .... lb	2	4	[illegible]	8	[illegible]
" lavendulæ comp .... lb.	1/2	1	[illegible]	[illegible]	5
" vini gallici .... bott	[illegible]	24	[illegible]	[illegible]	96
Strychniæ .... dr	1	2	[illegible]	4	[illegible]
Sulphuris loti .... lb.	1	2	[illegible]	4	8
Syrupi scillæ .... lb.	[illegible]	6	[illegible]	12	24
Tincturæ aconiti radicis .... lb	1	[illegible]	[illegible]	4	8
" digitalis .... oz.	4	[illegible]	12	16	32
" ergotæ (Dublin) .... lb.	4	[illegible]	12	16	32

TABLE FOR GENERAL AND POST HOSPITALS—Continued.

Articles.	Quantities for one year for commands of—					Memoranda.
	From 100 to 200.	From 200 to 300.	From 300 to 400.	500 men.	1,000 men.	
Tincturæ ferri chloridi.....lb.	½	1	2	2½	5	
" veratri viridis.....oz.	4	8	12	16	32	
Unguenti hydrargyri.....lb.	1	2	3	4	8	
" " nitratis.....lb.	½	1	2	2½	5	
Veratriæ .....dr.	1	2	3	4	8	
Vini colchici seminis.....lb.	½	1	2	2½	5	
Zinci acetatis.....oz.	1	2	3	4	8	
Zinci sulphatis.....oz.	1	2	3	4	8	
INSTRUMENTS.						
Buck's instrument for the throat...no.	1	1	1	1	1	
Cupping glasses or tins.....no.	12	12	18	18	24	
Dissecting.....sets.	1	1	1	1	1	
Lancets, spring.....no.	1	1	2	2	4	Four extra fleams to each lancet.
" thumb .....no.	4	6	8	8	12	With cases.
Obstetrical.....sets.	1	1	1	1	1	
Pocket .....sets.	1	1	1	1	1	
Probangs.....no.	6	6	6	6	6	
Pulleys .....sets.	1	1	1	1	1	

Scarificators ..... no.	2	2	2	3	4	
Splints (assorted) ..... sets.	1	1	1	1	2	
Stethoscopes ..... no	1	1	1	1	1	
Stomach pump and case ..... no	1	1	1	1	1	
Syringes, enema ..... no	3	3	3	4	6	1 Davidson's; 1, 4-oz.; 1, 8-oz.
" penis, glass ..... no.	2	4	6	8	16	
" " metallic ..... no.	6	12	18	24	36	
" vagina ..... no	3	6	3	3	6	Hard India rubber, 1; glass, 2.
Teeth extracting ..... sets.	1	1	1	1	2	
Tongue depressor (hinge) ..... no.	1	1	1	1	2	
Tourniquets, field ..... no.	4	4	6	6	10	
" spiral ..... no.	1	1	2	2	4	
Trusses, hernia ..... no.	3	6	9	12	24	
BOOKS.						
Anatomy ..... cop	1	1	1	1	1	
Chemistry ..... cop.	1	1	1	1	1	
Dispensatory ..... cop	1	1	1	1	1	
Medical Dictionary ..... cop.	1	1	1	1	1	
Medical Formulary ..... cop	1	1	1	1	1	
" Jurisprudence and Toxicology ..... cop	1	1	1	1	1	
" Practice ..... cop	1	1	1	1	1	
Obstetrics ..... cop	1	1	1	1	1	
Regulations for Med. Department cop.	1	1	1	2	2	
Surgery ..... cop	1	1	1	1	1	
Blank ..... no.	2	2	2	3	4	
Case ..... no.	1	1	1	1	1	
Meteorological Register ..... no	1	1	1	1	1	

TABLE FOR GENERAL AND POST HOSPITALS—Continued.

Articles.	Quantities for one year for commands of—					Memoranda.
	From 100 to 200.	From 200 to 300.	From 300 to 400.	500 men.	1,000 men.	
Order and Letter ..... no.	1	1	1	1	1	
Prescription ..... no.	1	1	1	1	1	
Register ..... no.	1	1	1	1	1	
Requisitions, Returns, Reports of sick ..... no.	1	1	1	1	1	
HOSPITAL STORES.						
Arrow root ..... lb.	5	10	15	20	40	
Barley ..... lb.	20	40	60	80	160	
Cinnamon ..... lb.	½	1	2	2½	5	
Cloves ..... oz.	4	8	12	16	32	
Cocoa ..... lb.	10	20	30	40	80	
Farina ..... lb.	5	10	15	20	40	
Ginger, ground (Jamaica) ..... lb.	½	1	2	2½	5	
Nutmegs ..... oz.	4	8	12	16	32	
Tea ..... lb.	20	40	60	80	160	
Whiskey, bottles of ..... doz.	2	4	6	8	16	
Wine, bottles of ..... doz.	2	4	6	8	16	

BEDDING						
Bed sacks .... no.	10	20	30	40	[illegible]	
Bedsteads, iron .... no.	6-10	12-20	1[illegible]	21-40	4[illegible]-80	
Blankets, woollen .... no.	1[illegible]	[illegible]	[illegible]	40-80	[illegible]-1[illegible]	
Coverlets .... no.	10	20	[illegible]	40	80	
Gutta percha cloth .... yds.	4	6	[illegible]	10	16	
Mattresses .... no.	[illegible]	4	6	[illegible]	16	
Mosquito bars .... no.	6-10	12-20	1[illegible]-20	21-40	4[illegible]-80	
Pillow cases .... no.	25	[illegible]	75	100	[illegible]	
" ticks .... no.	1[illegible]	20	[illegible]	40	[illegible]	
Sheets .... no.	40	[illegible]	1[illegible]	200	400	
FURNITURE, DRESSINGS, ETC.						
Bandages, suspensory .... no.	4	8	12	16	[illegible]	Assorted.
Binders' boards .... no.	4	6	8	[illegible]	16	18 inches by 4.
Corks, assorted .... doz.	1[illegible]	24	36	4[illegible]	[illegible]	
Cork screws .... no.	1	1	2	2	8	
Cotton batting .... lb.	1	2	3	4	[illegible]	
Cotton wadding .... lb.	1	[illegible]	[illegible]	4	[illegible]	
Flannel, red .... yds.	[illegible]	10	[illegible]	[illegible]	40	
Funnels, glass .... no.	[illegible]	1	[illegible]	[illegible]	4	
" tin .... no.	1	1	2	2	2	
Hatchets .... no.	1	1	[illegible]	[illegible]	2	
Hones (in wood) .... no.	1	1	1	1	1	4 inches by 1.
Ink powder .... papers.	[illegible]	[illegible]	[illegible]	[illegible]	4	
Inkstands .... no.	1	1	3	[illegible]	2	
Linen .... yds.	5	10	15	[illegible]	40	
Lint .... lb.	4	[illegible]	[illegible]	[illegible]	[illegible]	

TABLE FOR GENERAL AND POST HOSPITALS—Continued.

Articles.	Quantities for one year for commands of—					Memoranda.
	From 100 to 200.	From 200 to 300.	From 300 to 400.	500 men.	1,000	
Measures, graduated.....no.	3	3	4	6	6	
" tin.....sets.	1	1	1	1	1	
Medicine cups and glasses.....no.	3	6	9	12	24	2 cups to 1 glass.
Mills, coffee.....no.	2	2	2	3	4	
Mortars and pestles, glass.....no.	1	1	2	2	2	
" " iron.....no.	1	1	1	1	1	
" " wedgewood...no.	1	2	2	3	3	
Muslin.....yds.	25	50	75	100	200	
Needles, sewing.....no.	25	25	25	25	50	
Oiled silk or gutta percha tissue, or India rubber tissue.....yds.	4	6	6	8	12	
Pans, bed.....no.	2	2	3	4	5	
Paper envelopes.....no.	100	125	150	200	250	Assorted, 3 sizes. "Official business" printed on each.
Paper, filtering.....quires.	½	1	2	2	3	
" wrapping.....quires.	10	12	15	15	20	
" writing.....quires.	12	20	20	20	30	Foolscap, letter, and note—white; blue ruled.
Pencils, hair.....no.	12	18	24	30	50	
" lead.....no.	6	8	10	12	18	

Each Medical Officer will also be supplied with the following surgical instruments for his personal use, which he will retain in his immediate possession so long as he remains in the Army, and for the complete and serviceable condition of which at all times he will be held responsible:

AMPUTATING.

1 Capital Saw.
1 Metacarpal Saw.
1 Capital Amputating Knife.
1 Medium " "
1 Small " "
1 Large Catling.
1 Small "
1 Scalpel.
1 Tenaculum.
1 Artery Needle.
1 " Forceps.
1 Bone "
1 Spiral Tourniquet.
12 Surgeon's Needles.
1 Mahogany case, brass bound.
1 Gutta-percha Pouch.

TREPHINING.

2 Trephines.
1 Scalpel, with Raspitor.
1 Heys' Saw.
1 Elevator.
1 Brush.
1 Mahogany Case, brass bound.

EXSECTING.

1 Bone Forceps, Liston's.
2 Bone Forceps, sharp, assorted.
1 Bone forceps, for sequestra.
1 Chain Saw.
1 Chisel.
1 Gouge.
1 Lenticular Knife.
2 Spatulas, protecting.
1 Trephine, small crown.
1 Ecraseur.
1 Mahogany case, brass bound.
1 Gutta-percha Pouch.

GENERAL OPERATING.

1 Metacarpal Saw.
1 Trocar.
1 Ball Forceps.
1 Gullet "
1 Artery "
1 Dressing "
2 Scissors, straight and curved.
1 Artery Needle, with 4 points.
12 Surgeon's Needles.
1 Tourniquet.
1 Small Amputating Knife.
1 " Catling.
3 Bistouries.
1 Hernia Knife.
3 Scalpels.
1 Cataract Knife.
1 " Needle.
1 Tenaculum.
1 Double Hook.
6 Steel Bougies, silvered, double curve, Nos. 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, 11 and 12.
6 Wax Bougies, Nos. 2, 4, 6, 8, 10.
3 Silver Catheters, Nos. 3, 6, 9.
6 Gum-elastic Catheters, Nos. 1, 3, 5, 7, 9, 11.
2 Mahogany Cases, brass bound.
1 Gutta-percha Pouch.

POCKET.

1 Large Scalpel.
1 Small "
1 Artery Forceps.
1 Bull-dog "
1 Curved "
1 Dressing "

1 Needle.
1 Sharp-pointed Bistoury.
1 Probe-pointed "
1 Long Probe-pointed Bistoury.
1 Straight Scissors.
1 Knee "
1 Flat-curved Scissors.
1 Gum Lancet.
1 Tenaculum.
1 Tenotomy Knife.
1 Abscess Lancet.
1 Exploring Needle.
1 Exploring Trocar.
1 Seton Needle.
1 Spatula.
2 Probes.
1 Director.
1 Double Canula
1 Camp'd Silver Catheter.
6 Surgeon's Needles.
1 Artery Needle.
1 Morocco Case.

1 Leather Trunk.

To each General and Post Hospital, one ounce of *bromine*, with printed directions for preparing and administering Hébron's antidote to the poison of *serpents*. Also one bottle of *liquor ferri per sulphatis*, and one bottle of *liquor ammonia*, in equal proportions, with printed directions for preparing speedily and for administering the *hydrated sesqui-oxide of iron*, as an antidote to poisoning by *arsenic*.

If the following articles of Hospital Furniture cannot be obtained with the hospital fund, they may be procured from a quartermaster or medical disbursing officer, by special requisition:

ARTICLES.

Basins, wash.
Bowls.
Brushes.
Buckets.
Candlesticks.
Clothes Lines.
Cups.
Dippers and Ladles.
Graters.
Gridirons.
Kettles, tea.
Knives and forks.
Lamps and Lanterns.
Locks and Keys.
Mugs.
Pans, frying.
" tart.
Pitchers.
Plates and Dishes.
Pots, chamber and closet.
" coffee and tea.
Scalirons.
Shovels, fire.
Snuffers.
Spoons.
Tongs and Pokers.
Tumblers.
Woodsaws.

STANDARD SUPPLY TABLE FOR FIELD SERVICE.

Articles.	Quantities. Reg't 3 mos.	Bat. 3 mos.	Comp. 3 mos.	Memoranda.
MEDICINES.				
Acidi acetici.....lb.	1	1/2	1/2	
" sulphurici aromatici.....lb.	1	1/2	1/4	
" tannici.....oz.	2	1	1	
Alcoholis.....cong.	2	1	1/2	
Aluminis.....lb.	1	1/2	1/4	
Ammoniæ carbonatis.....oz.	16	8	4	
Antimonii et potass. tartratis.....oz.	2	1	1	
Argenti nitratis (crystals).....oz.	2	1	1/2	
" " (fused).....oz.	2	1	1/2	
Brominii.....oz.	1	1	1	
Camphoræ.....lb.	4	2	1	
Ceræ albæ.....oz.	2	2	1	
Cerati resinæ.....lb.	2	1	1/2	
" simplicis.....lb.	8	4	2	
Chloroformi.....lb.	2	1	1	
Copaibæ.....lb.	2	1	1/2	
Creasoti.....oz.	2	1	1	
Cupri sulphatis.....oz.	4	2	1	
Emplastri adhæsivi.....yds.	10	5	3	
" cantharidis.....lb.	4	3	1	

Emplastri ichthyocollæ.....yds.	10	5	3
Extracti belladonnæ.....oz	1	1	1
" buchu fluidi.....lb.	1	1/2	1/4
" colchici aceticl.....oz.	2	1	1
" colocynthidis comp.....oz	16	8	4
" glycyrrhizæ.....lb.	2	1	1/2
" rhei fluidi.....lb.	2	1	1/2
" senegæ fluidi.....oz	8	4	4
" sennæ fluidi.....lb.	2	1	1/2
Ferri per sulphatis.....oz.	4	2	1
Hydrargyri chloridi corrosivi.....oz.	1/2	1/2	1/2
" " mitis.....lb.	2	1	1/2
Iodinii.....oz.	4	2	1
Liquoris ammoniæ.....lb.	4	2	1
" potassæ arsenitis.....oz	4	2	1
Magnesiæ sulphatis.....lb.	20	10	5
Massæ pil. hydrargyri.....oz.	16	8	4
Morphiæ sulphatis.....dr.	4	2	1
Olei caryophilli.....oz.	1	1	1
" menthæ piperitæ.....oz.	2	1	1
" olivæ.....bott	8	4	2
" ricini.....qt. bott.	12	6	3
" terebinthinæ.....qt. bott.	8	4	2
" tiglii.....dr.	2	1	1
Pilul. cathartic. comp. (U. S.)...doz.	6	3	2
" opii (U. S.).....doz.	8	4	2
" quiniæ sulphatis (5 grs.).....oz	8	4	2
Plumbi acetatis.....lb.	2	1	1/2
Potassæ bicarbonatis.....lb.	1	1/2	1/4
" chloratis.....lb.	2	1	1/2

TABLE FOR FIELD SERVICE—Continued.

Articles.	Quantities. Reg't 3 mos.	Bat. 3 mos.	Comp 3 mos.	Memoranda.
Potassæ nitratis ..... lb.	1	1/2	1/4	
Potassii cyanureti ..... dr.	1	1	1	
" iodidi ..... oz.	8	4	2	
Pulveris acaciæ ..... lb.	4	2	1	
" capsici ..... lb.	1/2	1/4	1/4	
" ipecacuanhæ ..... lb.	1	1/2	1/4	
" " et opii ..... oz.	8	4	4	
" lini ..... lb.	16	8	4	
" opii ..... lb.	2	1	1/2	
" rhei ..... lb.	1/2	1/4	1/4	
" sinapis nigræ ..... lb.	12	6	3	
Quiniæ sulphatis ..... oz.	24	12	6	
Sacchari ..... lb.	10	5	2	
Saponis ..... lb.	8	4	2	
Sodæ bicarbonatis ..... lb.	1	1/2	1/2	
Spiritus ammoniæ aromatici ..... oz.	4	2	2	
" ætheris comp ..... lb.	1	1/2	1/2	
" " nitrici ..... lb.	2	1	1/2	
" vini gallici ..... bott.	24	12	6	
Strychniæ ..... dr.	1	1	1	
Tincturæ aconiti radicis ..... lb.	1	1/2	1/4	
" ferri chloridi ..... lb.	1	1/2	1/4	

Tincturæ opii..... oz.	16	8	6	
" veratri viridis.....oz.	8	4	2	
Unguenti hydrargyri .....lb.	1	½	¼	
" " nitratis,.....lb	½	¼	¼	
Zinci acetatis..... oz.	2	1	1	
Zinci sulphatis..... oz.	2	1	1	
INSTRUMENTS.				
Buck's instrument for the throat...no.	1	1	1	
Cupping glasses and tins .....no.	12	8	4	Half glass, half tin.
Lancets, spring..... no.	1	1	1	
" thumb (with case) . ....no	6	4	2	
Pocket .....sets	1	1	1	
Probangs, whalebone.....no	12	6	2	
Scarificators .....no.	4	2	1	
Splints (major) .....sets	1	1	1	
Stomach pump and case ..... no	1	1	1	
Syringes, enema .....no	4	2	1	1 Davidson's; 1 hard rubber, 6 oz.
" penis, glass .....no	8	4	2	
" " India rubber. ....no.	8	4	2	
Teeth extracting .....sets.	1	1	1	
Tongue depresser (hinge).....no	1	1	1	
Tourniquets, field..... no.	8	4	2	
" spiral.. ....no.	2	2	1	
Trusses, hernia .....no	2	2	2	
BOOKS.				
Anatomy, surgical .....cop	1	1	1	

TABLE FOR FIELD SERVICE—Continued.

Articles.	Quantities. Reg't 3 mos.	Bat. 3 mos.	Comp. 3 mos.	Memoranda.
Medical Practice .....cop.	1	1	1	
Regulations for Med. Department.cop.	1	1	1	
Surgery (operative).....cop.	1	1	1	
Thompson's Conspectus.....cop.	1	1	1	
Blank.....no.	4	4	4	
HOSPITAL STORES.				
Arrow root.....lb.	10	5	3	
Candles (sperm).....lb.	2	1	1	
Farina .....lb.	10	5	3	
Ginger (fluid extract).....lb.	1	½	¼	
Nutmegs .....oz.	8	4	2	
Tea.....lb.	30	15	7	
Whiskey, bottles of.....doz.	2	1	½	
BEDDING.				
Blankets, woollen .....no.	20-40	10-20	10	Brown.
Blanket cases .....no.	1 for	10 blankets.		Of canvas, after pattern.
Gutta-percha cloth.....yds.	8	4	2	
" " bed covers.....no.	8	4	2	So constructed as to form, when united, a continuous spread or covering.

Musquito bars.....no.	12	6	4	
FURNITURE AND DRESSINGS.				
Bandages, roller, assorted.....doz.	14	7	4	
" suspensory, assorted....no.	12	6	4	
Binders' boards.....no.	18	9	5	18 inches by 4.
Buckets, leather.....no.	4	2	2	BANDAGES.
Corks, assorted.....doz.	12	6	3	1 dozen, 1 inch wide, 1 yard long.
Corkscrews.....no	2	1	1	2 " 2 " 3 "
Cotton batting.....lb.	2	1	1/2	2 " 2½ " 3 "
" wadding.....lb.	2	1	1/2	1 " 3 " 4 "
Flannel, red.....yds.	5	3	2	1/2 " 3½ " 5 "
Hatchets.....no.	2	1	1	1/2 " 4 " 6 "
Hones.....no.	1	1	1	4 inches by 1, in wood.
Ink, 2-ounce bottles.....no.	12	6	3	
Knapsack, hospital.....no.	..	..	..	According to pattern.
Lanterns.....no.	4	2	1	
Lint.....lb.	8	4	2	
Litters and stretchers, hand.....no.	..	..	..	} According to pattern.
" horse.....no.	..	..	..	
Measures, graduated, assorted.....no.	4	2	2	6 oz., 2 oz., minim.
Medicine chests.....no.	..	..	..	
" cups and glasses.....no.	6	3	2	2 cups to one glass.
" panniers.....no.	..	..	..	
Mess chests.....no.	..	..	..	See note.
Mills, coffee.....no.	2	1	1	
Mortars and pestles, wedgewood...no.	2	1	1	Small.
Muslin.....yds.	20	10	5	
Needles, sewing.....no.	25	25	25	Assorted, in a case.

TABLE FOR FIELD SERVICE—Continued.

Articles.	Quantities. Reg't 3 mos.	Bat. 3 mos.	Comp'y 3 mos.	Memoranda.
Oiled silk or gutta-percha tissue, or India-rubber tissue.....yds.	8	4	2	
Pans, bed.....no.	2	1	1	Of hard India-rubber or other material. Shovel.
Paper envelopes, assorted.....no.	100	50	25	50 letter, 25 note, 25 large. "Official business" printed on each.
Paper, wrapping .....quires.	6	3	1	
" writing.....quires.	12	6	3	2 foolscap, 6 letter, 4 note, white; blue ruled.
Pencils, hair .....no.	24	12	6	
" lead .....no.	12	6	3	Of Faber's make, No. 2.
Pens, steel.....doz.	4	2	1	
Pill-boxes (wood).....papers.	2	1	1	
" (tin).....no.	6	6	6	
Pins, assorted.....papers.	4	2	2	Large and medium.
Razors.....no.	1	1	1	
Razor strops.....no.	1	1	1	
Scales and weights, apothecary's .sets.	1	1	1	
Scissors.....no.	4	2	2	
Sheep-skins, dressed.....no.	4	2	1	
Silk, surgeon's.....oz.	1/2	1/4	1/4	
" green.....yds.	1	1/2	1	

Scissors.....no.	6	3	2	
Sponge (washed).....lb.	1	½	¼	
Tape.....piece	4	2	1	
Thread, linen.....oz.	2	1	1	
Tiles.....no.	2	1	1	
Towels.....no.	40	20	10	
Twine.....lb.	1	½	¼	
Urinals.....no.	4	2	1	
Vials, assorted.....gross	4	2	1	1 oz. and 2 oz.
Wafers (½ oz. boxes).....no.	1			
Wax, sealing.....stick	2	1	1	

NOTE.—Furniture of Mess Chest.

8 Basins, tin.
2 Boxes, pepper and salt.
6 Cups, tin.
4 Canisters, (for tea, coffee, sugar, and butter.)
2 Dippers and ladles.
1 Grater.
1 Gridiron.
1 Kettle, tea, iron.
12 Knives and forks.
6 Mugs, Britannia, (½ pint.)
1 Pan, frying.
1 Pan, saucepan.
8 Plates (6) and dishes (2), tin.
1 Pot, iron.
2 Pots, coffee and tea, tin.
12 Spoons, mess, (table [6] and tea [6].)
1 Tray, tin.
6 Tumblers, tin.

The above report and proposed supply tables are approved and adopted, and will be observed by all concerned, and existing General Regulations are modified so as to conform to the same. The tables contain all the articles to be purchased by medical purveyors, except on the orders of the Surgeon-General; but any less quantity may be required, or any article omitted, at the discretion of the medical officer.

The transfer of the surgical instruments issued to each medical officer for his personal use, is positively forbidden. These instruments will be accounted for to the Surgeon-General on the 31st day of December annually: in a special return, in which the true condition of each must be stated; and if any be lost or damaged, a report of the facts and circumstances attending such loss or damage must be given.

The Quartermaster Department will cause ambulances of each pattern to be constructed without unnecessary delay, as follows: one at Philadelphia under the supervision of Surgeon C. A. Finley, one at Cincinnati under Surgeon C. S. Tripler, and one at Washington, D. C., under Assistant-Surgeon R. H. Coolidge. He will then cause seven of each of the two-wheeled, and three of the four-wheeled ambulances to be constructed after these as models, and distributed as designated by the Board, for trial in active service according to the recommendation of the same, under direction of the several Department Commanders.

By order of the Secretary of War:

S. COOPER,
Adjutant-General.

Official:

Assistant Adjutant-General.